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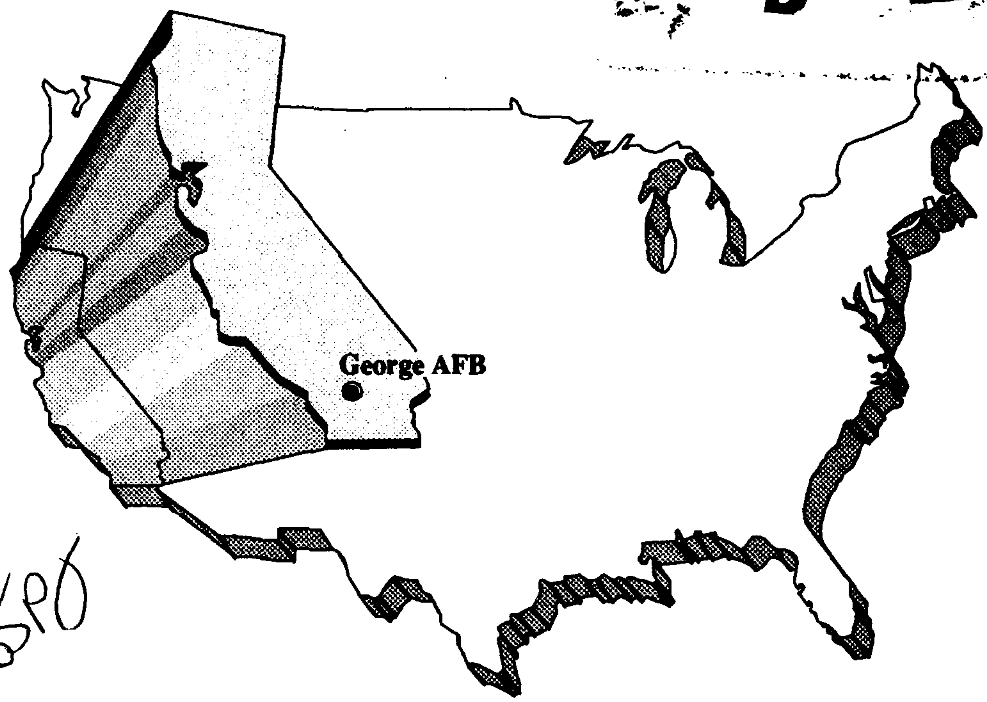
FINAL
ENVIRONMENTAL IMPACT STATEMENT
March 1992

VOLUME I



DISPOSAL AND REUSE OF GEORGE AIR FORCE BASE, CALIFORNIA

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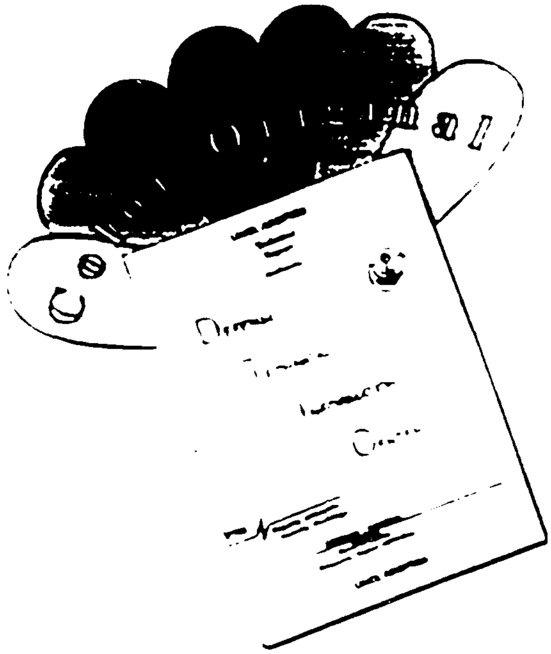

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FINAL

ENVIRONMENTAL IMPACT STATEMENT

DISPOSAL AND REUSE OF GEORGE AIR FORCE BASE, CALIFORNIA

Volume I

March 1992

COVER SHEET

FINAL ENVIRONMENTAL IMPACT STATEMENT
DISPOSAL AND REUSE OF GEORGE AIR FORCE BASE, CALIFORNIA

a. Responsible Agency: U.S. Air Force

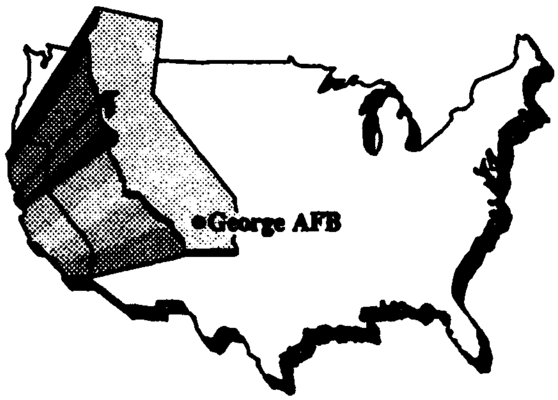
b. Cooperating Agency: Federal Aviation Administration

c. Proposed Action: Disposal and Reuse of George Air Force Base (AFB), San Bernardino County, California

d. Written comments and inquiries on this document should be directed to: Lt. Col. Thomas J. Bartol, Director of Environmental Division, AFCEE/ESE, Norton Air Force Base, California, 92409-6448, (714) 382-4891.

e. Designation: Final Environmental Impact Statement (FEIS).

f. Abstract: On January 5, 1989, the Secretary of Defense announced the closure of George AFB, California, pursuant to the Base Closure and Realignment Act. Previous environmental documentation culminated in the filing of a *Final Environmental Impact Statement for the Closure of George AFB* on May 4, 1990. A *Record of Decision* (ROD) for the action was signed June 20, 1990. The base is scheduled for closure December 15, 1992. This EIS has been prepared in accordance with the National Environmental Policy Act to analyze the potential environmental consequences of the disposal and reasonable alternatives for reuse of the base. The document includes analyses of the potential impacts each alternative may have on the local community, including land use and aesthetics, transportation, utilities, hazardous materials/wastes, geology and soils, water resources, air quality, noise, biological resources and cultural resources. Potential environmental impacts are increased aircraft-related noise levels, increased traffic, reduced wildlife habitat, alteration of topography, alteration of water flow and drainage patterns, and temporary effects of elevated concentrations of particulate matter during construction. Traffic mitigations include contributions to area roadway improvements. If avoidance of biological resources is not adequate or possible, mitigation in the form of replacement, restoration, or enhancement is possible. Because the Air Force is disposing of the property, some of the mitigation measures are beyond the control of the Air Force. Remediation of Installation Restoration Program sites is and will continue to be the responsibility of the Air Force.



SUMMARY

SUMMARY

PURPOSE AND NEED

On May 3, 1988, the Secretary of Defense established the Commission on Base Realignment and Closure to examine the issue of military installation realignments and closures. On October 24,1988, the Congress and the President endorsed the Commission and its charter by passing the Defense Authorization Amendments and Base Closure and Realignment Act (BCRA) (Public Law 100-526).

The Commission submitted its report to the Secretary of Defense on December 29, 1988. George Air Force Base (AFB), California, was one of the bases recommended by the Commission for closure. The Secretary of Defense approved the Commission's recommendations on January 5, 1989 and announced that the Department of Defense would implement them.

BCRA also requires the Secretary of Defense to comply with the National Environmental Policy Act (NEPA) in the implementation of base closures and realignments. The Secretary of Defense, through the Air Force, is preparing the required NEPA documents for the base closures. On May 4, 1990, the Air Force released the *Final Environmental Impact Statement for the Closure of George AFB*, which addressed environmental impacts associated with base closure. The *Record of Decision* (ROD) was signed on June 20, 1990.

The Air Force must now make a series of interrelated decisions concerning the disposition of the base property. In support of these decisions, this EIS has been prepared to provide information on the potential environmental impacts resulting from several alternatives for reuse of the base property after disposal. After completion and consideration of this EIS, the Air Force will prepare decision documents stating the terms and conditions under which the dispositions will be made, including the mitigation measures, if any, that may be taken by the Air Force or be required of the recipients. These decisions may affect the environment by influencing the nature of the future use of the property. Further environmental analysis and documentation may be required to address other actions that may be proposed in the future.

The Air Force selected as the Proposed Action reuse of George AFB as a civilian airport for the purpose of evaluating possible environmental impacts resulting from the incident reuse of the installation. This plan was developed by the Victor Valley Economic Development Authority (VVEDA) and centers around a regional commercial and general aviation airport for reuse of the base property. This proposal would entail the acquisition of approximately 2,352 acres off base of which 2,217 acres would be added to the existing airfield for incorporation into the airport development area. Non-aviation land uses

proposed for property within the existing base boundary include commercial, industrial, and recreation/vacant land.

The following alternatives to the Proposed Action are also being considered:

- Redevelopment of the base as an international airport. The primary differences from the Proposed Action are (1) the larger airport development district proposed for the International Airport, (2) the greater area of off-base property identified for acquisition, and (3) the substantial increase in the projected number of annual flight operations.
- Redevelopment of the base as a commercial airport. This plan is very similar to the Proposed Action except for the addition of a large residential land use in the existing base housing area, and the restriction of the proposed airfield and aviation support area within the current base boundaries.
- Redevelopment of approximately 50 percent of the base as a general aviation center with a limited number of aircraft maintenance operations. The remainder of base property would remain inactive.
- Redevelopment of the base with non-aviation land uses such as industrial, educational, medical, recreational, and residential.
- Integration of various proposed federal agency property transfers and independent land use concepts with the Proposed Action and alternatives.
- The No-Action Alternative, which entails the base remaining under federal control and being placed in caretaker status.

SCOPE OF STUDY

The *Notice of Intent* to prepare an EIS for the disposal and reuse of George AFB was published in the Federal Register on September 28, 1990. Issues related to the disposal and reuse of George AFB were identified in the closure scoping meeting held on March 14, 1989 at the Holiday Inn at Victorville, California. The scoping period for the disposal and reuse of George AFB was from September 28, 1990 to November 30, 1990. A public scoping meeting was held on October 29, 1990 at the Holiday Inn at Victorville, California. The comments and concerns expressed at these meetings were used to determine the scope and direction of studies and analyses required to accomplish this EIS.

This EIS discusses the potential environmental impacts associated with the Proposed Action and its alternatives. To provide the context in which potential environmental impacts may occur, discussions of potential changes to the local communities, including population and employment, land use and aesthetics, transportation, and community and public utility services are included in this EIS. In addition, issues related to current and future management of hazardous materials and wastes are discussed. Impacts to the physical and natural environment are evaluated for soils and geology, water resources, air quality, noise, biological resources, and cultural resources. These impacts may occur as a direct result of disposal and reuse actions or as an indirect result of changes to the local communities.

The baseline assumed in this document is the conditions projected at base closure. Impacts associated with disposal and/or reuse activities may then be addressed separately from the impact associated with base closure. General preclosure conditions and impacts of closure were addressed in the closure EIS. A reference to preclosure conditions is provided, where appropriate (e.g., air quality), to provide a comparative analysis over time. This will assist the decision maker and agencies in understanding potential long-term impacts in comparison to conditions when the installation was active.

The Air Force is also preparing a separate *Socioeconomic Impact Analysis Study* on the economic impacts expected in the region. That document, although not required by NEPA, provides assistance to local governments and redevelopment agencies.

SUMMARY OF ENVIRONMENTAL IMPACTS

Influencing factors and potential environmental impacts associated with the Proposed Action and alternatives for reuse of George AFB are summarized in 5, 10, and 20 year intervals in Tables S-1 through S-6 and briefly described below. Influencing factors are non-biophysical elements, such as population, employment, land use, aesthetics, public utility systems, and transportation networks, that directly impact the environment. Site-related regional population and employment effects for the Proposed Action and all alternatives are illustrated in Figures S-1 and S-2.

SUMMARY OF PUBLIC COMMENTS

The Draft EIS (DEIS) for disposal and reuse of George AFB was made available for public review and comment in October-November 1991. A public hearing was held in Victorville, California, on October 17, 1991, at which the Air Force presented the findings of the DEIS. Public comments received both verbally at the public meeting and in writing during the response period have been reviewed and are addressed by the Air Force in Volume II of this EIS. In addition, the text of the EIS itself has been revised, as appropriate, to reflect the concerns expressed in the public comments. The responses to the comments in Volume II indicate the relevant sections of the EIS that have been revised.

SUMMARY OF CHANGES FROM THE DEIS TO THE FEIS

Based on more recent studies or comments from the public, the following sections of the EIS have been updated or revised:

- The discussion of MAP (Sections 1.3.1, 2.2.1, 2.3.1, 4.2.3.1, and 4.2.3.2) have been revised.
- Additional information has been included in proposed airfield improvements and conceptual airport master plans (Sections 2.2.1 and 2.3.1).

Table S-1. Summary of Project-Related Influencing Factors for Reuse of George AFB in the Year 1998*
Page 1 of 2

Resource Category	Proposed Action	International Airport Alternative	Commercial Airport with Residential Alternative	General Aviation Center Alternative	Non-Aviation Alternative	No-Action Alternative
Local Community						
• Population						
Victor Valley	Increase of 8,100	Increase of 32,000	Increase of 5,000	Increase of 5,700	Increase of 3,100	No increase in long term
ROI	Increase of 9,400	Increase of 36,500	Increase of 5,800	Increase of 6,500	Increase of 3,400	No increase in long term
• Direct Employment (on-site)	Increase of 9,100	Increase of 36,100	Increase of 5,100	Increase of 6,100	Increase of 2,300	No increase in long term
• Indirect Employment						
Victor Valley	Increase of 5,000	Increase of 13,400	Increase of 2,800	Increase of 3,800	Increase of 1,000	No increase in long term
ROI	Increase of 9,200	Increase of 25,000	Increase of 5,300	Increase of 5,800	Increase of 1,400	No increase in long term
• Traffic (annual average daily trips)	Increase of 33,000	Increase of 146,100	Increase of 75,400	Increase of 79,300	Increase of 60,900	No change
• Flight Operations (annual)	Increase of 53,600	Increase of 103,400	Increase of 53,600	Increase of 28,600	No increase	No change
• Water Demand (gpd)	Increase of 1.8 million	Increase of 7.3 million	Increase of 1.1 million	Increase of 1.5 million	Increase of 0.7 million	No change
• Sewage Demand (gpd)	Increase of 0.4 million	Increase of 1.6 million	Increase of 0.3 million	Increase of 0.3 million	Increase of 0.2 million	No change
• Solid Waste Generation (cubic yards per year)	Increase of 0.04 million	Increase of 0.16 million	Increase of 0.02 million	Increase of 0.03 million	Increase of 0.02 million	No change
• Electricity Demand (MWH/day)	Increase of 170	Increase of 680	Increase of 110	Increase of 140	Increase of 70	No change
• Natural Gas Demand (therms/day)	Increase of 9,300	Increase of 36,700	Increase of 5,800	Increase of 7,500	Increase of 3,500	No change
• Land Use	Acquisition of 338 acres required. Relocation of 1 residence. Conflicts with residential development.	Acquisition of 6,338 acres required. Relocation of 490 residences, 2 apartments, and 30 non-residential establishments. Conflicts with residential development.	No property acquisition required. Conflict with current zoning.	No property acquisition required. Potential conflict with residential-zoned areas.	No property acquisition required. Conflict with current zoning.	No change

* Factors reflect change in Proposed Action and all alternatives over No-Action Alternative in 1998 (e.g., employment under Proposed Action is reduced by the number of DMT employees).

Table S-1. Summary of Project-Related Influencing Factors for Reuse of George AFB in the Year 1998*
Page 2 of 2

Resource Category	Proposed Action	International Airport Alternative	Commercial Airport with Residential Alternative	General Aviation Center Alternative	Non-Aviation Alternative	No-Action Alternative
• Ground Disturbance (on and off base)	502 acres (on base) 101 acres (off base)	1,164 acres (on-base) 268 acres (off base)	430 acres (on base)	220 acres (on base)	975 acres (on base)	No change
Hazardous Material/Waste Management						
• Hazardous Materials	Increase in types and quantities	Increase in types and quantities	Increase in types and quantities	Increase in types and quantities	Increase in types and quantities	No change
• Hazardous Waste	Increase in types and quantities	Increase in types and quantities	Increase in types and quantities	Increase in types and quantities	Increase in types and quantities	No change
• IRP	No impact, remediation may delay redevelopment	No impact, remediation may delay redevelopment	No impact, remediation may delay redevelopment	No impact, remediation may delay redevelopment	No impact, remediation may delay redevelopment	No impact
• Storage Tanks	Reuse of some existing tanks. Removal as required	Reuse of some existing tanks. Removal as required	Reuse of some existing tanks. Removal as required	Reuse of some existing tanks. Removal as required	Reuse of some existing tanks. Removal as required	Maintenance/ removal as required
• Asbestos	Some renovation/ demolition may require management in place or removal	Some renovation/ demolition may require management in place or removal	Some renovation/ demolition may require management in place or removal	Some renovation/ demolition may require management in place or removal	Some renovation/ demolition may require management in place or removal	No change
• Pesticides and Herbicides	No impact	No impact	No impact	No impact	No impact	No change
• PCBs	No impact	No impact	No impact	No impact	No impact	No change
• Radon	No impact	No impact	No impact	No impact	No impact	No change
• Medical/Biohazardous Waste	No impact	No impact	No impact	No impact	No impact	No change

* Factors reflect change in Proposed Action and all alternatives over No-Action Alternative in 1998 (e.g., employment under Proposed Action is reduced by the number of DMT employees).

Table S-2. Summary of Project-Related Influencing Factors for Reuse of George AFB in the Year 2003*
Page 1 of 2

Resource Category	Proposed Action	International Airport Alternative	Commercial Airport with Residential Alternative	General Aviation Center Alternative	Non-Aviation Alternative	No-Action Alternative
Local Community						
• Population						
Victor Valley	Increase of 16,900	Increase of 36,400	Increase of 8,700	Increase of 7,800	Increase of 5,700	No increase in long term
ROI	Increase of 19,600	Increase of 41,600	Increase of 10,100	Increase of 8,900	Increase of 6,300	No increase on long term
• Direct Employment (on-site)	Increase of 17,900	Increase of 38,800	Increase of 8,700	Increase of 8,100	Increase of 4,100	No increase in long term
• Indirect Employment						
Victor Valley	Increase of 10,000	Increase of 15,900	Increase of 15,100	Increase of 5,100	Increase of 1,700	No increase in long term
ROI	Increase of 18,100	Increase of 28,600	Increase of 9,700	Increase of 7,800	Increase of 2,400	No increase in long term
• Traffic (annual average daily trips)	Increase of 64,900	Increase of 171,600	Increase of 101,900	Increase of 95,900	Increase of 101,500	No change
• Flight Operations (annual)	Increase of 64,700	Increase of 264,400	Increase of 64,700	Increase of 37,600	No change	No change
• Water Demand (gpd)	Increase of 3.8 million	Increase of 8.3 million	Increase of 2.0 million	Increase of 2.0 million	Increase of 1.2 million	No change
• Sewage Demand (gpd)	Increase of 1.1 million	Increase of 2.3 million	Increase of 0.5 million	Increase of 0.6 million	Increase of 0.4 million	No change
• Solid Waste Generation (cubic yards per year)	Increase of 0.08 million	Increase of 0.18 million	Increase of 0.04 million	Increase of 0.04 million	Increase of 0.03 million	No change
• Electricity Demand (MWH/day)	Increase of 360	Increase of 780	Increase of 190	Increase of 190	Increase of 120	No change
• Natural Gas Demand (therms/day)	Increase of 19,300	Increase of 41,800	Increase of 9,900	Increase of 10,200	Increase of 6,500	No change
• Land Use	Acquisition of 473 acres required. Relocation of 1 residence. Conflicts with residential development	Acquisition of 7,013 acres required. Relocation of 490 residences, 2 apartments, and 30 non-residential establishments. Conflicts with residential development and current zoning	No property acquisition required. Conflict with current zoning	No property acquisition required. Potential conflict with residential-zoned areas	No property acquisition required. Conflict with current zoning	No change

* Factors reflect change in Proposed Action and all alternatives over No-Action Alternative in 2003 (e.g., employment under Proposed Action is reduced by the number of DMT employees).

Table S-2. Summary of Project-Related Influencing Factors for Reuse of George AFB in the Year 2003*
Page 2 of 2

Resource Category	Proposed Action	International Airport Alternative	Commercial Airport with Residential Alternative	General Aviation Center Alternative	Non-Aviation Alternative	No-Action Alternative
• Ground Disturbance (on and off base)	1,289 acres (on base) 101 acres (off base	2,381 acres (on base) 3,705 acres (off base)	1,315 acres (on base)	220 acres (on base)	2,139 acres (on base)	No change
Hazardous Material/Waste Management						
• Hazardous Materials	Increase in types and quantities	Increase in types and quantities	Increase in types and quantities	Increase in types and quantities	Increase in types and quantities	No change
• Hazardous Waste	Increase in types and quantities	Increase in types and quantities	Increase in types and quantities	Increase in types and quantities	Increase in types and quantities	No change
• IRP	No impact, remediation may delay redevelopment	No impact, remediation may delay redevelopment	No impact, remediation may delay redevelopment	No impact, remediation may delay redevelopment	No impact, remediation may delay redevelopment	No impact
• Storage Tanks	Reuse of some existing tanks. Removal as required	Reuse of some existing tanks. Removal as required	Reuse of some existing tanks. Removal as required	Reuse of some existing tanks. Removal as required	Reuse of some existing tanks. Removal as required	Maintenance/ removal as required.
• Asbestos	Some renovation/ demolition may require management in place or removal	Some renovation/ demolition may require management in place or removal	Some renovation/ demolition may require management in place or removal	Some renovation/ demolition may require management in place or removal	Some renovation/ demolition may require management in place or removal	No change
• Pesticides and Herbicides	No impact	No impact	No impact	No impact	No impact	No change
• PCBs	No impact	No impact	No impact	No impact	No impact	No change
• Radon	No impact	No impact	No impact	No impact	No impact	No change
• Medical/Biohazardous Waste	No impact	No impact	No impact	No impact	No impact	No change

* Factors reflect change in Proposed Action and all alternatives over No-Action Alternative in 2003 (e.g., employment under Proposed Action is reduced by the number of DMT employees).

Table S-3. Summary of Project-Related Influencing Factors for Reuse of George AFB in the Year 2013*
Page 1 of 2

Resource Category	Proposed Action	International Airport Alternative	Commercial Airport with Residential Alternative	General Aviation Center Alternative	Non-Aviation Alternative	No-Action Alternative
Local Community						
• Population						
Victor Valley	Increase of 26,600	Increase of 56,700	Increase of 14,100	Increase of 8,500	Increase of 12,500	No increase in long term
ROI	Increase of 30,700	Increase of 64,900	Increase of 16,500	Increase of 9,800	Increase of 13,900	No increase in long term
• Direct Employment (on site)	Increase of 25,300	Increase of 54,800	Increase of 13,000	Increase of 8,000	Increase of 8,600	No increase in long term
• Indirect Employment						
Victor Valley	Increase of 15,000	Increase of 31,000	Increase of 8,200	Increase of 5,100	Increase of 3,500	No increase in long term
ROI	Increase of 25,700	Increase of 50,400	Increase of 15,200	Increase of 7,700	Increase of 5,200	No increase in long term
• Traffic (annual average daily trips)	Increase of 95,700	Increase of 309,900	Increase of 146,400	Increase of 95,900	Increase of 185,600	No change
• Flight Operations (annual)	Increase of 76,000	Increase of 670,300	Increase of 76,000	Increase of 54,000	No change	No change
• Water Demand (gpd)	Increase of 6.1 million	Increase of 12.9 million	Increase of 3.2 million	Increase of 2.2 million	Increase of 2.8 million	No change
• Sewage Demand (gpd)	Increase of 1.8 million	Increase of 3.9 million	Increase of 1.0 million	Increase of 0.7 million	Increase of 0.9 million	No change
• Solid Waste Generation (cubic yards per year)	Increase of 0.13 million	Increase of 0.28 million	Increase of 0.07 million	Increase of 0.05 million	Increase of 0.06 million	No change
• Electricity Demand (MWH/day)	Increase of 580	Increase of 1,240	Increase of 310	Increase of 210	Increase of 270	No change
• Natural Gas Demand (therms/day)	Increase of 30,500	Increase of 65,000	Increase of 16,100	Increase of 11,100	Increase of 14,300	No change
• Land Use	Acquisition of 2,352 acres required. Relocation of 1 residence. Conflicts with residential development	Acquisition of 8,353 acres required. Relocation of 490 residences, 2 apartments, and 30 non-residential establishments. Conflicts with residential development and current zoning.	No property acquisition required. Conflict with current zoning	No property acquisition required. Potential conflict with residential-zoned areas	No property acquisition required. Conflict with current zoning	No change

* Factors reflect change in Proposed Action and all alternatives over No-Action Alternative in 2013 (e.g., employment under Proposed Action is reduced by the number of DMT employees).

Table S-3. Summary of Project-Related Influencing Factors for Reuse of George AFB in the Year 2013*

Resource Category	Proposed Action	International Airport Alternative	Commercial Airport with Residential Alternative	General Aviation Center Alternative	Non-Aviation Alternative	No-Action Alternative
• Ground Disturbance (on and off base)	2,439 acres (on base) 202 acres (off base)	2,506 acres (on base) 4,581 acres (off base)	2,568 acres (on base)	220 acres (on base)	3,762 acres (on base)	No change
Hazardous Material/Waste Management						
• Hazardous Materials	Increase in types and quantities	Increase in types and quantities	Increase in types and quantities	Increase in types and quantities	Increase in types and quantities	No change
• Hazardous Waste	Increase in types and quantities	Increase in types and quantities	Increase in types and quantities	Increase in types and quantities	Increase in types and quantities	No change
• IRP	No impact, remediation may delay redevelopment	No impact, remediation may delay redevelopment	No impact, remediation may delay redevelopment	No impact, remediation may delay redevelopment	No impact, remediation may delay redevelopment	No impact
• Storage Tanks	Reuse of some existing tanks. Removal as required	Reuse of some existing tanks. Removal as required	Reuse of some existing tanks. Removal as required	Reuse of some existing tanks. Removal as required	Reuse of some existing tanks. Removal as required	Maintenance/ removal as required
• Asbestos	Some renovation/ demolition may require management in place or removals	Some renovation/ demolition may require management in place or removals	Some renovation/ demolition may require management in place or removals	Some renovation/ demolition may require management in place or removals	Some renovation/ demolition may require management in place or removals	No change
• Pesticides and Herbicides	No impact	No impact	No impact	No impact	No impact	No change
• PCBs	No impact	No impact	No impact	No impact	No impact	No change
• Radon	No impact	No impact	No impact	No impact	No impact	No change
• Medical/Biohazardous Waste	No impact	No impact	No impact	No impact	No impact	No change

* Factors reflect change in Proposed Action and all alternatives over No-Action Alternative in 2013 (e.g., employment under Proposed Action is reduced by the number of DMT employees).

Table S-4. Summary of Projected Environmental Impacts of Reuse of George AFB in the Year 1998*

Resource Category	Proposed Action	International Airport Alternative	Commercial Airport with Residential Alternative	General Aviation Center Alternative	Non-Aviation Alternative	No-Action Alternative
Natural Environment						
• Soils and Geology	Increase in erosion and alteration of natural surface and soil conditions (603 acres ground disturbance)	Increase in erosion and alteration of natural surface and soil conditions (1,432 acres ground disturbance)	Increase in erosion and alteration of surface and soil conditions (430 acres ground disturbance)	No impact due to limited new construction (220 acres ground disturbance)	Increase in erosion and alteration of natural surface and soil conditions (975 acres ground disturbance)	No impact
• Water Resources	Net increase to existing groundwater overdraft of 1 to 2 percent	Net increase to existing groundwater overdraft of 5 to 8 percent	Net increase to existing groundwater overdraft of 1 percent	Net increase to existing groundwater overdraft of 1 percent	Net increase to existing groundwater overdraft of 1 percent	No impact
• Air Quality	Emissions of NO_x, ROG, and PM_{10} could interfere with attainment of standards	Emissions of NO_x, ROG, and PM_{10} could interfere with attainment of standards	Emissions of NO_x, ROG, and PM_{10} could interfere with attainment of standards	Emissions of NO_x, ROG, and PM_{10} could interfere with attainment of standards	No impact	No impact
• Noise	Projected aircraft noise levels would expose no people to 65 DNL or greater. Traffic noise will expose 26 residences to 65 DNL or greater	Projected aircraft noise levels would expose 64 people to 65 DNL or greater. Traffic noise will expose 180 residences to 65 DNL or greater	Projected aircraft noise levels would expose no people to 65 DNL or greater. Traffic noise will expose 32 residences to 65 DNL or greater	Projected aircraft noise levels would expose no people to 65 DNL or greater. Traffic noise will expose 51 residences to 65 DNL or greater	Traffic noise will expose 12 residences to 65 DNL or greater	No impact
• Biology	Maximum of 603 acres of vegetation will be altered or lost. 135 acres of potential desert tortoise habitat will be permanently lost	1,432 acres of vegetation will be altered or lost. 625 acres of potential desert tortoise habitat will be permanently lost	430 acres of vegetation will be altered or lost. 63 acres of potential desert tortoise habitat will be permanently lost	220 acres of vegetation will be altered or lost. 9 acres of potential desert tortoise habitat will be permanently lost	975 acres of vegetation will be altered or lost. 300 acres of potential desert tortoise habitat will be permanently lost	No impact
• Cultural Resources	No impact on base	No impact on base	No impact	No impact	No impact	No impact

* Impacts reflect change over post-closure conditions in 1998.

Table S-5. Summary of Projected Environmental Impacts of Reuse of George AFB in the Year 2003*

Resource Category	Proposed Action	International Airport Alternative	Commercial Airport with Residential Alternative	General Aviation Center Alternative	Non-Aviation Alternative	No-Action Alternative
Natural Environment						
• Soils and Geology	Increase in erosion and alteration of natural surface and soil conditions (1,390 acres ground disturbance)	Increase in erosion and alteration of natural surface and soil conditions (6,086 acres ground disturbance)	Increase in erosion and alteration of surface and soil conditions (1,315 acres ground disturbance)	No impact due to limited new construction (220 acres ground disturbance)	Increase in erosion and alteration of surface and soil conditions (2,139 acres ground disturbance)	No impact
• Water Resources	Net increase to existing groundwater overdraft of 3 percent	Net increase to existing groundwater overdraft of 6 to 8 percent	Net increase to existing groundwater overdraft of 1 to 2 percent	Net increase to existing groundwater overdraft of 1 to 2 percent	Net increase to existing groundwater overdraft of 1 percent	No impact
• Air Quality	Emissions of NO_x, ROG, and PM_{10} could interfere with attainment of standards	Emissions of NO_x, ROG, and PM_{10} could interfere with attainment of standards	Emissions of NO_x, ROG, and PM_{10} could interfere with attainment of standards	Emissions of NO_x, ROG, and PM_{10} could interfere with attainment of standards	No impact	No impact
• Noise	Projected aircraft noise levels would expose no people to 65 DNL or greater. Traffic noise will expose 32 residences to 65 DNL or greater	Projected aircraft noise levels would expose 293 people to 65 DNL or greater. Traffic noise will expose 218 residences to 65 DNL or greater	Projected aircraft noise levels would expose no people to 65 DNL or greater. Traffic noise will expose 44 residences to 65 DNL or greater	Projected aircraft noise levels would expose no people to 65 DNL or greater. Traffic noise will expose 88 residences to 65 DNL or greater	Traffic noise will expose 76 residences to 65 DNL or greater	No impact
• Biology	1,390 acres of vegetation will be altered or lost. 925 acres of potential desert tortoise habitat will be permanently lost	6,086 acres of vegetation will be altered or lost. 4,237 acres of potential desert tortoise habitat will be permanently lost	1,315 acres of vegetation will be altered or lost. 543 acres of potential desert tortoise habitat will be permanently lost	220 acres of vegetation will be altered or lost. 9 acres of potential desert tortoise habitat will be permanently lost	2,139 acres of vegetation will be altered or lost. 830 acres of potential desert tortoise habitat will be permanently lost	No impact
• Cultural Resources	No impact on base	No impact on base	No impact	No impact	No impact	No impact

* Impacts relect change over post-closure conditions in 2003.

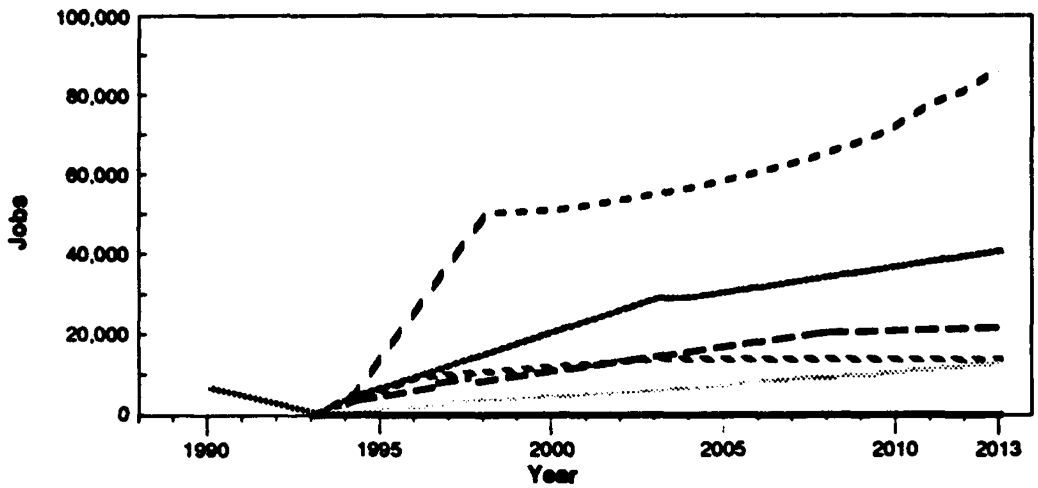
Table S-6. Summary of Projected Environmental Impacts of Reuse of George AFB in the Year 2013*

Resource Category	Proposed Action	International Airport Alternative	Commercial Airport with Residential Alternative	General Aviation Center Alternative	Non-Aviation Alternative	No-Action Alternative
Natural Environment						
• Soils and Geology	Increase in erosion and alteration of natural surface and soil conditions (2,641 acres ground disturbance)	Increase in erosion and alteration of natural surface and soil conditions (7,087 acres ground disturbance)	Increase in erosion and alteration of surface and soil conditions (2,568 acres ground disturbance)	No impact due to limited new construction (220 acres ground disturbance)	Increase in erosion and alteration of natural surface and soil conditions (3,762 acres ground disturbance)	No impact
• Water Resources	Net increase to existing groundwater overdraft of 4 to 5 percent	Net increase to existing groundwater overdraft of 8 to 11 percent	Net increase to existing groundwater overdraft of 2 to 3 percent	Net increase to existing groundwater overdraft of 1 to 2 percent	Net increase to existing groundwater overdraft of 1 to 2 percent	No impact
• Air Quality	Emissions of NO_x, ROG, PM_{10} could interfere with attainment of standards	Emissions of NO_x, ROG, PM_{10} could interfere with attainment of standards	Emissions of NO_x, ROG, PM_{10} could interfere with attainment of standards	Emissions of NO_x, ROG, PM_{10} could interfere with attainment of standards	Emissions of NO_x, ROG, PM_{10} could interfere with attainment of standards	No impact
• Noise	Projected aircraft noise levels would expose no people to 65 DNL or greater. Traffic noise will expose 59 residences to 65 DNL or greater	Projected aircraft noise levels would expose 128 people to 65 DNL or greater. Traffic noise will expose 417 residences to 65 DNL or greater	Projected aircraft noise levels would expose no people to 65 DNL or greater. Traffic noise will expose 97 residences to 65 DNL or greater	Projected aircraft noise levels would expose no people to 65 DNL or greater. Traffic noise will expose 112 residences to 65 DNL or greater	Traffic noise will expose 136 residences to 65 DNL or greater	No impact
• Biology	2,641 acres of vegetation will be altered or lost. 1,333 acres of potential desert tortoise habitat will be permanently lost	7,087 acres of vegetation will be altered or lost. 5,112 acres of potential desert tortoise habitat will be permanently lost	2,568 acres of vegetation will be altered or lost. 953 acres of potential desert tortoise habitat will be permanently lost	220 acres of vegetation will be altered or lost. 9 acres of desert tortoise habitat will be permanently lost	3,762 acres of vegetation will be altered or lost. 1,233 acres of potential desert tortoise habitat will be permanently lost	No impact
• Cultural Resources	No impact on base.	No impact on base.	No impact	No impact	No impact	No impact

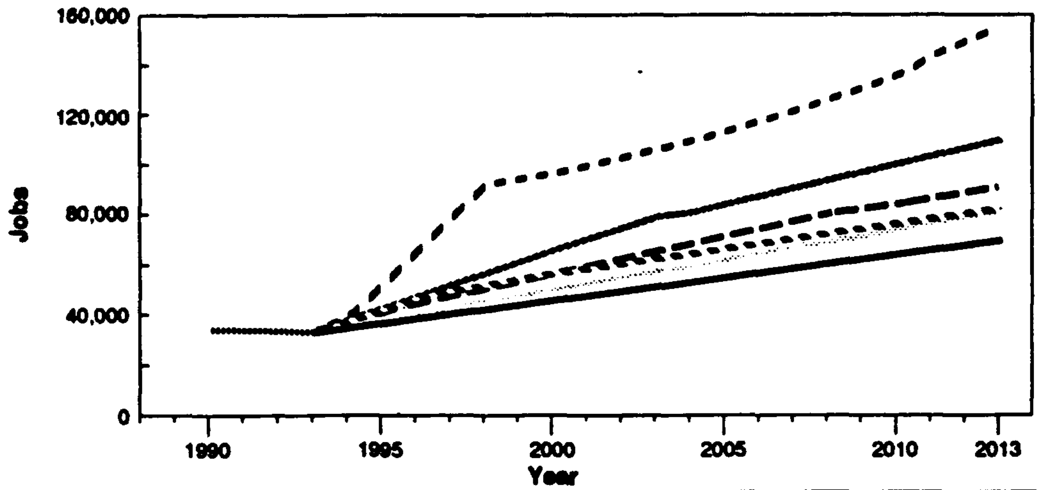
* Impacts reflect change over post-closure conditions in 2013.

ALTERNATIVE	1993	1998	2003	2013
Proposed Action	70	14,200	27,900	40,400
International Airport	70	49,600	54,700	86,900
Commercial Airport with Residential	70	8,000	13,800	21,200
General Aviation Center	70	10,000	13,200	13,100
Non-Aviation	70	3,400	5,800	12,200
No Action	70	70	70	70

Site-Related Victor Valley Job Impacts



Site-Related Victor Valley Job Impacts



Total Victor Valley Jobs with Impacts of Alternatives

EXPLANATION

- No Action/Post-Closure
- Proposed Action
- International Airport
- Non-Aviation
- Commercial Airport
- General Aviation Center
- Preclosure

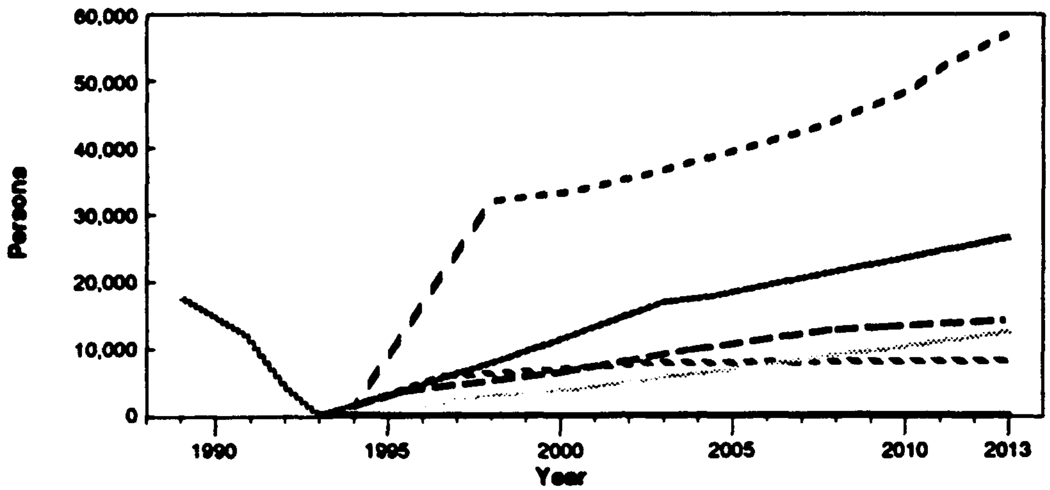
Data refer to employment impacts within the Victor Valley area of San Bernardino County directly or indirectly related to the George AFB site.

Site-Related Victor Valley Employment Impacts and Total Employment Projections

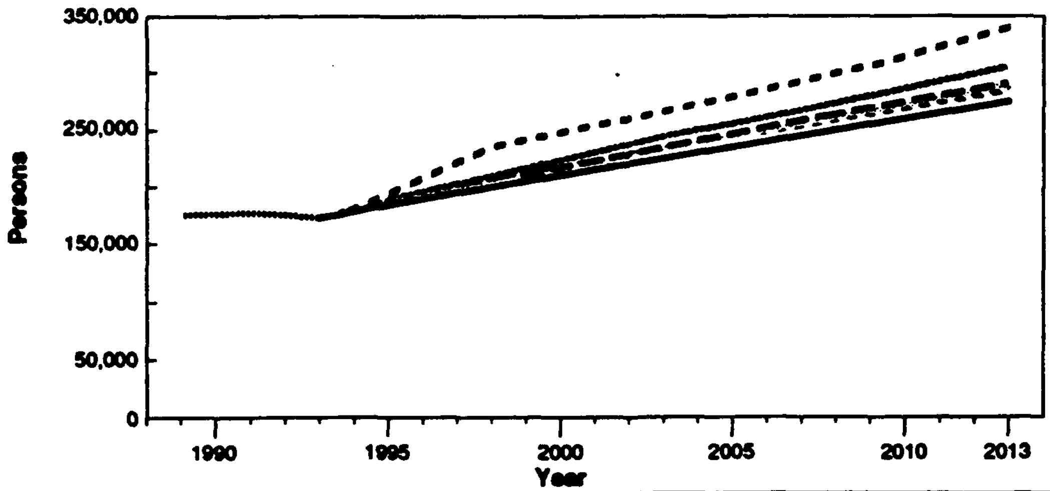
Figure S-1

ALTERNATIVE	1993	1998	2003	2013
Proposed Action	0	8,100	16,900	26,600
International Airport	0	32,000	36,400	56,700
Commercial Airport with Residential	0	5,000	8,700	14,100
General Aviation Center	0	5,700	7,800	8,500
Non-Aviation	0	3,100	5,700	12,500
No Action	0	0	0	0

Site-Related Victor Valley Population Impacts



Site-Related Victor Valley Population Impacts



Total Victor Valley Population with Impacts of Alternatives

EXPLANATION

- No Action/Post-Closure
- Proposed Action
- International Airport
- Non-Aviation
- Commercial Airport
- General Aviation Center
- Preclosure

Data refer to population impacts within the Victor Valley area of San Bernardino County directly or indirectly related to the George AFB site.

Site-Related Victor Valley Population Impacts and Total Population Projections

Figure S-2

- Hazardous Materials/Hazardous Waste Management (Sections 3.3 and 4.3) includes expanded discussion discussions on the following:
  - FFA schedule
  - Impacts of the IRP process on reuse development
  - Characterization of IRP sites
  - Evaluation and effects of each IRP site relevant to each alternative's land uses
  - Concept of risk associated with certain types of development and IRP sites.
- Air quality (Section 4.4.3) has been revised to include discussion of emission credits and credit transfer.
- Where applicable, the probable success of mitigation measures has been described. The discussion was not included for some resource areas; for example, mitigation measures involving wastewater treatment are considered an engineering issue, since design modifications would be a way of handling increased demand on the facility.

PROPOSED ACTION

Local Community. Redevelopment activities associated with the Proposed Action would result in increases in population and employment in Victor Valley and in the Region of Influence (ROI) (San Bernardino and Riverside counties). Approximately 25,400 direct jobs are projected by the year 2013, with an additional 25,700 indirect jobs in the ROI. It is estimated that population in the Victor Valley region would be 26,600 persons greater, by 2013, and 30,700 persons greater in the ROI, with the Proposed Action than under post-closure conditions.

Under the Proposed Action, the acquisition of 2,352 acres of primarily privately owned land would be required, and one residence would have to be relocated. Redevelopment land use plans may result in minor conflicts with local zoning ordinances. Incompatibilities between existing residential and proposed commercial and industrial land uses west of the airfield have been identified. The presence of Installation Restoration Program (IRP) sites may constrain or delay reuse at these sites until the extent of contamination is delineated and risk assessments and remedial designs have been implemented. Transportation improvements would be required to prevent increased traffic generated by the Proposed Action from decreasing the levels of service on Air Base Road East and U.S. 395 to unacceptable levels. Proposed aircraft activities would not have any adverse effects on air traffic or airspace use in the region. No decrease in air passenger demand for other airports in the region is expected under the Proposed Action, whereas railroad transportation demand would increase.

Utility demands would increase over closure baseline projections as a result of the growing population and greater activity levels associated with the Proposed Action. Existing infrastructure would have to be modified to meet the needs of new users.

Hazardous Materials/Hazardous Waste. Types and quantities of hazardous materials and hazardous waste generated by the Proposed Action are expected to increase from closure conditions. The shift of responsibility for managing hazardous materials and waste from a single user to multiple, smaller, independent users may result in a potential reduction in service because there may no longer be one on-site organization capable of responding to hazardous materials and hazardous waste spills. Reuse activities are not expected to adversely affect the remediation of IRP sites. Existing underground storage tanks (USTs) would either be reused or removed prior to closure in accordance with San Bernardino County Environmental Health Services regulations. Effective management techniques would be in place for the proper use and handling of pesticides and herbicides. Demolition and renovation of structures with asbestos-containing materials would be managed in accordance with the National Emissions Standards for Hazardous Air Pollutants (NESHAP) and other applicable regulations.

Natural Environment. Redevelopment activities associated with the Proposed Action would result in an increase of 4 to 5 percent over the existing level of groundwater overdraft. Increased emissions could interfere with the attainment and maintenance of air quality standards for nitrogen oxides (NO_x), reactive organic gases (ROG), and particulate matter less than 10 microns in diameter (PM_{10}). Noise levels, especially those associated with aircraft activities, would increase under the Proposed Action. Projected noise contours indicate that approximately 920 acres will be exposed to day-night noise levels (DNL) of 65 decibels (dB) or greater by the year 2013; however, no residences are within areas exposed to DNL of 65 dB or greater. Surface traffic noise would expose 59 residences to a DNL of 65 dB or greater.

Potential impacts to biological resources could include a maximum loss of vegetation/habitat of 2,641 acres and a possible degradation of wetlands (1.32 acres). A maximum of 1,333 acres of known or suitable desert tortoise habitat could be lost as a result of implementation of the Proposed Action.

No adverse effect on cultural resources is expected for on-base property; development of off-base parcels would be accomplished in accordance with pertinent cultural resource regulations.

INTERNATIONAL AIRPORT ALTERNATIVE

Local Community. Redevelopment activities associated with the International Airport Alternative would result in larger increases in population and employment in Victor Valley and in the ROI than those projected for the Proposed Action. Approximately 54,800 direct jobs are projected by the year 2013, with an additional 50,500 indirect jobs in the ROI. It is estimated that population in the Victor Valley region would be 56,700 persons greater, by 2013, and 64,900 persons greater in the ROI, with the International Airport Alternative than under post-closure conditions.

Under this alternative 8,353 acres of primarily privately owned land would have to be acquired. Purchase/relocation of 489 residences, 2 apartment complexes, 1 ranch, 24 commercial establishments, 4 churches, and 2 government facilities would also be required. Redevelopment land use plans may result in minor conflicts with local zoning ordinances. The presence of IRP sites may constrain or delay reuse at these sites until the extent of contamination is delineated, risk assessments accomplished, and remedial designs have been implemented.

Transportation improvements would be required to prevent increased traffic generated by this alternative from decreasing the levels of service on Air Base Road (East and West), U.S. 395, Desert Flower, and El Mirage roads to unacceptable levels. Proposed aircraft activities constitute nearly 13 times the number of preclosure operations; thus, there could be an adverse effect on competing airspace uses in the region, as well as the surrounding enroute environment. No change in air passenger demand for other airports in the region is expected under the International Airport Alternative, but railroad transportation demand would increase.

Utility demands would increase over closure baseline projections as a result of the growing population and greater activity levels associated with this alternative. The existing infrastructure would have to be modified to meet the needs of new users.

Hazardous Materials/Hazardous Waste. Types and quantities of hazardous materials and hazardous waste associated with the International Airport Alternative are expected to be similar to those used for the Proposed Action, but the quantities used would be larger. The effects would likely be similar to those of the Proposed Action.

Natural Environment. Redevelopment activities associated with the International Airport Alternative would result in an increase of 8 to 11 percent over the existing level of groundwater overdraft. A substantial increase in emissions could exceed the air quality standards for NO_x, ROG, and PM_{10}. Noise levels, especially those associated with aircraft activities, would increase under this alternative. Projected noise contours indicate that approximately 5,696 acres and 128 people will be exposed to DNL of 65 dB or greater by the year 2013. Surface traffic noise would expose 417 residences to a DNL of 65 dB or greater.

Potential impacts to biological resources could include a maximum loss of vegetation/habitat of 7,087 acres and a possible degradation of wetlands (1.32 acres). A maximum of 5,112 acres of known or suitable desert tortoise habitat could be lost as a result of implementation of the International Airport Alternative. No adverse effect on cultural resources is expected for on-base property; development of off-base parcels would be accomplished in accordance with pertinent cultural resource regulations.

Local Community. Redevelopment activities associated with the Commercial Airport with Residential Alternative would result in smaller increases in population and employment in Victor Valley and in the ROI than those projected for the Proposed Action. Approximately 13,000 direct jobs are projected by the year 2013, with an additional 15,200 indirect jobs in the ROI. It is estimated that population in the Victor Valley region would be 14,100 persons greater, by 2013, and 16,500 persons greater in the ROI, with the Commercial Airport with Residential Alternative than under post-closure conditions.

Acquisition of off-base property would not be required under this alternative. Redevelopment land use plans may result in minor conflicts with local zoning ordinances. Incompatibilities between residential and proposed industrial land uses at the southwest corner of the base have been identified. The presence of IRP sites may constrain or delay reuse at these sites until the extent of contamination is delineated and risk assessments and remedial designs have been implemented.

Transportation improvements would be required to prevent increased traffic generated by the Commercial Airport with Residential Alternative from decreasing the levels of service on Air Base Road East and U.S. 395 to unacceptable levels. Proposed aircraft activities would not have any adverse effects on air traffic or airspace use in the region. The change in air and railroad passenger demand would be the same as under the Proposed Action.

Utility demands would increase over closure baseline projections as a result of the growing population and greater activity levels associated with the Commercial Airport with Residential Alternative. Existing infrastructure would have to be modified to meet the needs of new users.

Hazardous Materials/Hazardous Waste. Types and quantities of hazardous materials and hazardous waste associated with the Commercial Airport with Residential Alternative are expected to be similar to those used for the Proposed Action. The effects would likely be similar to those of the Proposed Action.

Natural Environment. Redevelopment activities associated with the Commercial Airport with Residential Alternative would result in an increase of 2 to 3 percent over the existing level of groundwater overdraft. Air quality and noise impacts would be the same as those under the Proposed Action, except that a total of 97 residences would be subject to a DNL of 65 dB or greater from surface traffic.

Potential impacts to biological resources could include a maximum loss of vegetation/habitat of 2,568 acres and a possible degradation of wetlands (1.32 acres). A maximum of 953 acres of known or suitable desert tortoise habitat could be lost as a result of implementation of the Proposed Action. No adverse effect on cultural resources is expected under this alternative.

Local Community. Redevelopment activities associated with the General Aviation Center Alternative would result in smaller increases in population and employment in Victor Valley and in the ROI than those projected for the Proposed Action. Approximately 8,000 direct jobs are projected by the year 2013, with an additional 7,700 indirect jobs in the two-county area. It is estimated that population in the Victor Valley region would be 8,500 persons greater by 2013, and 9,800 persons greater in the ROI, with the General Aviation Center Alternative than under post-closure conditions.

Acquisition of off-base property would not be required under this alternative. Redevelopment land use plans may result in minor conflicts with local zoning ordinances. Incompatibilities between residential and proposed aviation support land uses west of the airfield have been identified. The presence of IRP sites may constrain or delay reuse at these sites until the extent of contamination is delineated and risk assessments and remedial designs have been implemented.

Transportation improvements would be required to prevent increased traffic generated by the General Aviation Center Alternative from decreasing the levels of service on Air Base Road (East and West) and U.S. 395 to unacceptable levels. Proposed aircraft activities would not have any adverse effects on air traffic or airspace use in the region. No change in air passenger demand for other airports in the region is expected under this alternative, but railroad transportation demand would increase in proportion to population growth.

Utility demands would increase over closure baseline projections as a result of the growing population and greater activity levels associated with the General Aviation Center Alternative. Existing infrastructure would have to be modified to meet the needs of new users.

Hazardous Materials/Hazardous Waste. Types and quantities of hazardous materials and hazardous waste associated with the General Aviation Center Alternative are expected to be similar to those used for the Proposed Action, but the quantities used would be smaller. The effects would likely be similar to those of the Proposed Action.

Natural Environment. Redevelopment activities associated with the General Aviation Center Alternative would result in an increase of 1 to 2 percent in the existing level of groundwater overdraft. An increase in emissions could exceed the NO_x, ROG, and PM_{10} air quality standards. Projected noise contours indicate that approximately 117 acres will be exposed to DNL of 65 dB or greater; however, no residences will be exposed. Surface traffic noise would expose 112 residences to a DNL of 65 dB or greater.

Potential impacts to biological resources could include a maximum loss of vegetation/habitat of 220 acres. A maximum of 9 acres of known desert tortoise

habitat could be lost as a result of implementation of this alternative. No adverse effect on cultural resources is expected from implementation of this alternative.

NON-AVIATION ALTERNATIVE

Local Community. Redevelopment activities associated with the Non-Aviation Alternative would result in smaller increases in population and employment in Victor Valley and in the ROI than those projected for the Proposed Action. Approximately 8,600 direct jobs are projected by the year 2013, with an additional 5,200 indirect jobs in the ROI. It is estimated that population in the Victor Valley region would be 12,500 persons greater, by 2013, and 13,900 persons greater in the ROI, with the Non-Aviation Alternative than under post-closure conditions.

Acquisition of off-base property would not be required under this alternative. Redevelopment land use plans may result in minor conflicts with local zoning ordinances in the southwest corner of the base. The presence of IRP sites may constrain or delay reuse at these sites until the extent of contamination is delineated and risk assessments and remedial designs have been implemented.

Transportation improvements would be required to prevent increased traffic generated by the Non-Aviation Alternative from decreasing the levels of service on Air Base Road (East and West) and U.S. 395 to unacceptable levels. The lack of aircraft activities could have a beneficial effect on air traffic and airspace use in the region. Air and railroad passenger demand would increase in proportion to population growth.

Utility demands would increase over closure baseline projections as a result of the growing population and greater activity levels associated with the Non-Aviation Alternative. Existing infrastructure would have to be modified to meet the needs of new users.

Hazardous Materials/Hazardous Waste. Types and quantities of hazardous materials and hazardous waste associated with the Non-Aviation Alternative are expected to vary, but would be managed in accordance with all applicable regulations. The effects of this alternative would, therefore, be similar to those of the Proposed Action.

Natural Environment. Redevelopment activities associated with the Non-Aviation Alternative would result in an increase of 1 to 2 percent over the existing level of groundwater overdraft. There would be no impact to air quality. Surface traffic noise would expose 136 residences to a DNL of 65 dB or greater.

Potential impacts to biological resources could include a maximum loss of vegetation/habitat of 3,762 acres and a possible degradation of wetlands (1.32 acres). A maximum of 1,233 acres of known desert tortoise habitat could be lost as a result of implementation of this alternative. No adverse effect on

cultural resources is expected from implementation of the Non-Aviation Alternative.

OTHER LAND USE CONCEPTS

Federal transfers and independent land use concepts are analyzed in terms of their effects on the Proposed Action and other alternatives. Influencing factors and potential environmental impacts associated with these actions in conjunction with the Proposed Action and alternatives are summarized in Tables S-7 and S-8.

NO-ACTION ALTERNATIVE

Local Community. The only activities associated with the No-Action Alternative would be disposal management activities, creating less than 70 direct and indirect jobs. This alternative would not result in any increases in employment or population compared to closure levels.

No adverse land use effects are anticipated. The on-base structures would be left in place and maintained in a caretaker status. No effects on road, air, or railroad transportation are expected.

Hazardous Materials/Hazardous Waste. Small quantities of various types of hazardous materials, hazardous waste, and pesticides/herbicides would be used for this alternative and managed by the disposal management team in accordance with all applicable regulations. Security of IRP sites would be enhanced under this alternative. All USTs would have to be removed and/or provisions made for sufficient maintenance of all tanks.

Natural Environment. Beneficial effects on geological resources, soils, water resources, air quality, noise, biological resources, and cultural resources are expected as a result of the lack of reuse development and operations.

Table S-7. Summary of Project-Related Influencing Factors Associated with Other Land Use Concepts

Resource Category	Department of Justice	Department of Interior	Department of Housing and Urban Development	Department of Transportation	Department of Education	San Bernardino County Work Furlough Program	Medical Facilities
Local Community							
• Population (Victor Valley)	Increase of 2,375 (inmates)	No impact on population	No impact on population	No impact on population	Increase of 1,161 (students)	Increase of 200 (inmates)	No impact on population
• Direct Employment	Net decrease of 2,480 jobs (Proposed Action and International Airport); increase of 1,000 jobs (Commercial Airport with Residential, General Aviation Center, and Non-Aviation)	Net decrease of 205 jobs (International Airport), 960 jobs (Proposed Action), or increase of 5 jobs (Non-Aviation)	Net decrease of 677 jobs (Proposed Action) or 1,700 jobs (International Airport)	No impact on employment	Net decrease of 578 jobs (Proposed Action) or 45 jobs (International Airport)	Net decrease of 480 jobs (Proposed Action) or 102 jobs (International Airport)	Net decrease of 327 jobs (Proposed Action), or 915 jobs (International Airport)
• Traffic (Annual average daily trips)	Net decrease for Proposed Action (7.1 percent), International Airport (7.6 percent), Commercial Airport with Residential (17.6 percent), and Non-Aviation (21.3 percent); net increase of 2.7 percent for General Aviation Center	Net decrease of 0.2 percent for International Airport	Net decrease for Proposed Action (0.7 percent) and International Airport (1.4 percent)	No impact on traffic	Net decrease for Proposed Action (0.8 percent) and International Airport (0.2 percent)	Net decrease for Proposed Action (2.2 percent) and International Airport (0.1 percent)	Net decrease for Proposed Action (1.2 percent) and International Airport (1.3 percent)
• Flight Operations (annual)	No impact on flight operations	No impact on flight operations	No impact on flight operations	No impact on flight operations	No impact on flight operations	No impact on flight operations	No impact on flight operations
• Utilities Demand	Decrease for Proposed Action (10 percent) and International Airport (5 percent); increase for Commercial Airport with Residential (5 percent) and Non-Aviation (8 percent)	No impact on utilities	Decrease for Proposed Action (5 percent) and International Airport (3 percent)	No impact on utilities	No impact on utilities	Decrease of 5 percent for Proposed Action	No impact on utilities
• Land Use	No impact	No impact	Incompatible land use for Proposed Action and International Airport	Incompatible land use for Non-Aviation	Incompatible land use (schools only) for Proposed Action and International Airport	Incompatible land use for Proposed Action and International Airport	No impact
Hazardous Material/Waste	No impact	No impact	No impact	No impact	No impact	No impact	No impact

Table S-8. Summary of Projected Environmental Impacts Associated with Other Land Use Concepts

Resource Category	Department of Justice	Department of Interior	Department of Housing and Urban Development	Department of Transportation	Department of Education	San Bernardino County Work Furlough Program	Medical Facilities
• Soils and Geology	Short term impacts to soils during construction	No impact	No impact	No impact	Minor impact	Minor impact	No impact
• Water Resources	Decrease in demand for Proposed Action (10 percent), Non-Aviation (8 percent), and International Airport and Commercial Airport with Residential (5 percent)	No impact	No impact	No impact	No impact	No impact	No impact
• Air Quality	Slight increase in air emissions.	Slight increase in air emissions	Slight decrease in air emissions	No impact	Decrease in emissions due to reduced vehicular traffic	Slight increase in air emissions	Slight increase in air emissions
• Noise	No impact	No impact	No impact	No impact	No impact	No impact, if facilities are located outside the 65 dB contour	No impact
• Biological	Potential loss of desert tortoise habitat (maximum 580 acres); loss of vegetation and wildlife habitat due to construction	No impact	No impact	No impact	No impact	No impact	No impact
• Cultural Resources	No impact	No impact	No impact	No impact	No impact	No impact	No impact

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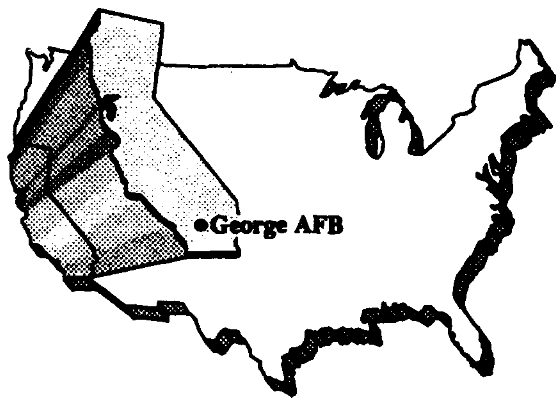

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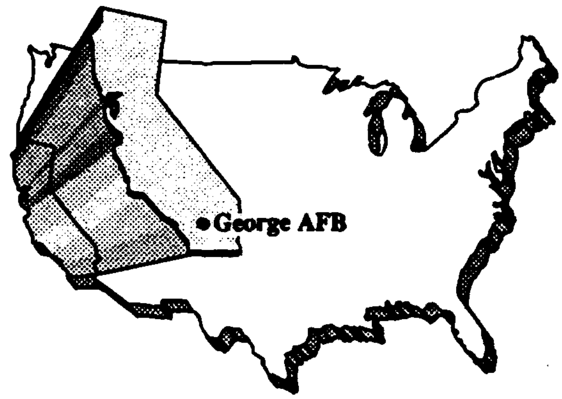

CHAPTER 1
PURPOSE AND NEED FOR ACTION

1.0 PURPOSE AND NEED FOR ACTION

This environmental impact statement (EIS) examines the potential impacts to the environment as a result of the disposal and reuse of George Air Force Base (AFB), California. This document has been prepared in accordance with the National Environmental Policy Act (NEPA) of 1969 and the Council on Environmental Quality (CEQ) regulations implementing NEPA. Appendix A presents a glossary of terms, acronyms, and abbreviations used in this document.

1.1 PURPOSE AND NEED

The Proposed Action addressed in this EIS would dispose of George AFB, in whole or part, to other federal agencies, public entities, and/or private parties. The closure of George AFB is authorized by the Defense Authorization Amendments and Base Closure and Realignment Act (BCRA) of 1988 (Public Law [P.L.] 100-526). The Secretary of Defense established the Commission on Base Realignment and Closure on May 3, 1988 to recommend military installations for realignment and closure, focusing on the military value of the installation as the primary criterion in identifying candidate bases. The United States Congress and the President endorsed the commission and its charter by implementing the Defense Authorization Amendments and BCRA on October 24, 1988.

The commission submitted its report to the Secretary of Defense on December 29, 1988, recommending realignments and closures affecting 145 military installations. Of these installations, 86 are to be closed, including George AFB. The Secretary of Defense approved the commission's recommendations on January 5, 1989 and announced that the Department of Defense (DOD) would implement the realignments and closures of the selected installations. Under the provisions of BCRA, the Secretary of Defense must initiate the recommended closures and realignments by September 30, 1991 and complete them before September 30, 1995.

The George AFB property will be disposed of in compliance with the Defense Authorization Amendments, BCRA, the Federal Property and Administrative Services Act of 1949, and the Surplus Property Act of 1944. The base is scheduled to be closed in December 1992.

Air Force decisions regarding the George AFB property include the following:

- If, how, and when the property will be divided into parcels for disposal (parcelization)
- What disposal method will be used for each parcel, such as:
  - transfer to another federal agency

- public benefit conveyance to an eligible entity
- negotiated sale to a public body
- sealed bid or auction to the general public

- What mitigation measures are needed for Air Force actions that could cause environmental impacts.

The Air Force goal is to dispose of George AFB property through transfer and/or conveyance to other government agencies or private parties. The Proposed Action supports the specific goal of base reuse, which is to enhance the aviation capacity of the state of California, particularly southern California. The development of a commercial airport in the Victor Valley could contribute an important source of revenue and employment opportunities for the communities in the area.

1.2 ENVIRONMENTAL IMPACT ANALYSIS PROCESS

BCRA also requires compliance with NEPA (with some exceptions) in the implementation of the base closures and realignments. The issues that were excluded from NEPA compliance are:

- The establishment of the Commission on Base Realignment and Closure
- The selection of installations for closure or realignment
- The Secretary of Defense's acceptance of the Commission's recommendations.

The Secretary of Defense, through the Air Force, is preparing the required NEPA documentation at each stage of the base closure process. The Air Force released the *Final EIS for the Closure of George AFB* on May 4, 1990, and published the Record of Decision (ROD) on June 20, 1990. That document addressed the environmental impacts associated with closure; the ROD is presented in Appendix B of this EIS.

The Air Force has prepared this EIS to provide information on the potential environmental impacts of federal decisions regarding the disposal and incident reuse of George AFB. Following the completion and consideration of this EIS, the Air Force will make a series of interrelated decisions regarding transfer, conveyance, and parcelization of the property to be disposed. The federal decision documents, such as the ROD, will state the terms and conditions of the conveyance, including the mitigation measures, if any, that will be completed by the Air Force or base property recipients. These decisions will affect the environment by determining or influencing the nature of the future use of the property.

Because the parcelization and disposal methods do not directly affect the environment, this EIS will focus on the environmental impacts associated with

the reuse implemented by future owners. The Air Force will use the redevelopment plans developed by the Victor Valley Economic Development Authority (VVEDA) as the Proposed Action for the purpose of conducting the required environmental analysis. In addition, the Air Force will analyze the environmental impacts associated with other reasonable reuse alternatives to ensure that all potential environmental impacts have been identified. The recipients of the property will subsequently determine the reuse of the property. Six alternatives have been identified, which include four aviation reuse proposals, a non-aviation reuse, and a no-action alternative that would not involve reuse.

The Federal Aviation Administration (FAA), through its Western-Pacific Region, is a cooperating agency in the preparation of this EIS. The FAA would have legal jurisdiction over the area of George AFB to be reused as a civilian airport. The FAA also has special expertise and a responsibility to make recommendations to the Air Force for the disposal of surplus property for airport use.

Certain activities inherent in the development or expansion of an airport constitute federal actions that fall under the statutory and regulatory authority of the FAA. The FAA generally reviews these activities through the processing and approval of an Airport Layout Plan (ALP). Goals of the ALP review system are to: (1) determine its effectiveness in achieving safe and efficient utilization of airspace, (2) assess factors affecting the movement of air traffic, and (3) establish conformance with FAA design criteria and federal government agreements (ref. Federal Aviation Regulation [FAR] Parts 77, 139, 150, 157, and 169). The FAA approval action may also include other specific elements such as preparation of the Airport Certification Manual (Part 139); the Airport Security Plan (Part 107); and the location, construction, or modification of an air traffic control (ATC) tower, terminal radar approach control (TRACON) facility, other navigational and visual aids, and facilities.

In view of its possible direct involvement with the reuse of George AFB, the FAA is serving as a cooperating agency in the preparation of this EIS. The primary federal laws and regulations that support the FAA's participation as a cooperating agency in the preparation of this EIS are as follows:

- **The Federal Aviation Act of 1958, as amended (P.L. 85-726)** provides authority for the FAA to develop air traffic control procedures and to manage the navigable airspace of the United States.
- **The Airport and Airway Improvement Act of 1982 (P.L. 97-248)** and, as amended, Airport and Airways Safety and Capacity Expansion Act of 1987 (P.L. 85-726) specifies that airport development projects may not be approved unless they are compatible with plans of local agencies for the development of the entire area in which the airport is located. Environmental impacts must be assessed prior to plan authorization. Projects that involve adverse effects will not be approved unless no prudent or feasible alternative exists and until all measures to mitigate adverse effects have been taken.

The potential environmental impacts of airport development must be assessed prior to commitment of federal funding, in accordance with NEPA and FAA Orders 1050.1D, *Policies and Procedures for Considering Environmental Impacts*, and 5050.4A, *Airport Environmental Handbook*.

Compliance with NEPA and FAA Regulations requires the preparation of proposed airport development plans. This EIS presents the assessment of potential environmental impacts of such plans as are available. If reuse proponents have developed only conceptual plans for the airport area, the environmental impacts of those concept plans are analyzed. The FAA may then use this document to complete their NEPA requirements when the ALP is submitted. This EIS also provides environmental assessment information to aid FAA decisions on funding requests for airport development projects. The new owners would be required to prepare a final ALP and submit it to the FAA, as appropriate, for approval.

The socioeconomic impacts of disposal and reuse of George AFB property are analyzed in this EIS only to the extent that those impacts affect the natural or physical environment. A detailed, concurrent study, presented in the *Socioeconomic Impact Analysis Study*, analyzes the socioeconomic impacts of the base closure and disposal and reuse of the base property. That study describes the effects on the local communities and the transition of activities on the base from conditions prior to closure and throughout redevelopment. Concerns of state and local agencies and the general public regarding those issues are addressed in that study.

1.3 SCOPING PROCESS

The scoping process identifies the significant issues relevant to the proposal and provides an opportunity for public involvement in the development of the EIS. Various issues related to the disposal and reuse of the base were identified during the George AFB Closure EIS scoping period (February 8 to April 8, 1989) and at the Closure Scoping Meeting held on March 14, 1989 at the Holiday Inn in Victorville, California.

The *Notice of Intent* (NOI) (Appendix C) to prepare an EIS for disposal and reuse of George AFB was published in the *Federal Register* on September 28, 1990. Notification of the public scoping meeting was published in local newspapers and announced on local radio stations, and mailers were sent to interested parties.

The scoping period for the disposal and reuse of George AFB was from September 28 to November 30, 1990. A public meeting was held on October 29, 1990 at the Holiday Inn in Victorville, California, to solicit comments and concerns from the general public on the disposal and reuse of George AFB. Approximately 40 people attended the meeting. Representatives of the Air

Force presented an overview of the meeting's objectives, agenda, procedures, and described the process and purpose for the development of a disposal and reuse EIS. In addition to verbal comments, several written comments were received during the scoping process. These comments, as well as information from previous Air Force scoping and Base Reuse Executive Council meetings, experience with similar programs, and NEPA requirements, were used to determine the scope and direction of studies/analysis to accomplish this EIS. Copies of this EIS have been mailed to all interested parties. Appendix D contains the distribution list.

1.3.1 Summary of Scoping Issues and Concerns

Issues that arose during the scoping period are summarized in this section for informational purposes. The summaries reflect the issues as they were presented and do not necessarily imply endorsement or acceptance by the Air Force. Issues and concerns raised during the scoping process, for consideration in this EIS, are summarized below.

Environmental Impacts

- The trichloroethylene (TCE) groundwater contamination emanating from the Installation Restoration Program (IRP) Northeast Disposal Area involves Victor Valley Wastewater Reclamation Authority (VVWRA) property. VVWRA presented the following demands:
  - contamination must be effectively and efficiently eliminated from VVWRA property
  - further contamination must be prevented
  - VVWRA and its affiliates must be assured that they will not be responsible for any costs or liability by virtue of the presence of any such contamination. This assurance must be included in the EIS.
- It was requested that DOD intensify its efforts to identify and remove hazardous and toxic wastes for the reuse of George AFB.
- A thorough discussion of remediation activities should be included in the EIS.
- Monitoring of air quality was recommended in order to formulate a baseline inventory and provide a standard by which changes can be measured.
- Impacts upon air quality resulting from proposed reuse activities should be analyzed. The analysis should address stationary, indirect, and mobile sources.
- Noise, hazardous materials exposure, and other potential health risks related to IRP cleanup activities should be addressed within the EIS.
- A site-specific risk assessment should be conducted for all proposed rezoning.
- Aboveground and underground storage tanks (USTs) must be permitted and approved for disposal by the county prior to removal.

Alternative Reuses

Aviation:

- Three reuse alternatives were presented by VVEDA. Under the first, George AFB would be reused (within the existing boundaries) as a regional hub for air carrier and general aviation airport activities. The peripheral properties of George AFB would be developed for aerospace-related industries, higher education/institutional development, office/business park development, health care services, and recreational facilities.

  The second VVEDA alternative involves developing George AFB as an airport in expanded phases, to eventually become a large hub airport. This proposal would entail the acquisition of additional property in order to extend runways, acquire clear zones, and increase airport operational capacities.

  The third VVEDA proposal envisions an evolving airport, developed within the existing boundaries of George AFB. The airport would begin as a regional air carrier facility and develop into a larger operation serving localities throughout the Pacific Southwest and the Pacific Rim countries.

  In conjunction with these proposals, it was recommended that the California Air National Guard should remain and that the airport should be operational in all reuse alternatives considered for George AFB.

- An aviation center was proposed for the reuse of George AFB that would retain existing housing for the homeless. In the event of a national emergency, the facility could easily accept an Air Force detachment and be reconverted to a military operation.
- A proposal was submitted to reuse George AFB and adjacent properties as an international airport designed to accommodate approximately 60 million annual passengers (MAP). **Note**: this figure was later revised by the city of Adelanto to 50 MAP.

Recreational:

- The National Park Service stated that it was not interested in acquiring any portion of George AFB properties, but supported the conveyance of facilities and land for park and recreational uses to local government agencies.
  - The city of Victorville expressed interest in acquiring the park and recreational facilities at George AFB through the public benefit conveyance program.
  - VVEDA supported the conveyance of the park and recreational facilities to the city of Victorville.

Other:

- The Federal Bureau of Prisons (BOP) is interested in acquiring 100 to 800 acres of base property for use as a correctional facility.
- Reuse alternatives should maximize utilization of all properties associated with George AFB.
- The U.S. Department of Education expressed interest in acquiring certain base property and facilities to convey to San Bernardino County and the local school district.

Socioeconomics

Employment:

All proposed George AFB reuse alternatives should maximize employment opportunities for the surrounding communities.

Housing:

- Retention of the 1,641 single- and multi-family housing units is incompatible with effective planning for the reuse of George AFB as a potential airport/airfield.
- It was suggested that support for the homeless be considered in the reuse of George AFB.

Disposal/Transfer

Infrastructure:

- Concern was expressed that potential impacts (specifically regarding safety, traffic, and roadbed) associated with transporting heavy, oversized, and/or hazardous materials over the state highway system be reviewed in the EIS.

  The existing infrastructure would either have to be completely upgraded under the reuse options or service would have to be restricted to that supportable by the existing infrastructure. A corresponding analysis should be included in the EIS.

  It was recommended that the proposed transportation system servicing the reuse options of George AFB should be financially feasible, delivered in a timely manner, practical relative to right-of-way issues, and agreeable to each particular jurisdiction.

- Prior to any future occupancy of George AFB, VVWRA will require modification of the existing sewage collection system by the potential user/owner. These modifications will include the following:
  - separation of industrial and domestic wastewater
  - provisions for pretreatment and spill containment for the industrial wastewaters
  - elimination of storm water from the sewage system.

  The sewage collection system of George AFB is presently served by the VVWRA, under special agreement, which will cease at base closure unless:
  - the U.S. Government continues the existing service agreement
  - the base property is annexed to a VVWRA member agency and subsequently annexed to VVWRA
  - VVWRA and its member agencies agree to serve, by special contract(s) with any person(s) or entity(ies), all or a portion of the base.

The VVWRA has granted the U.S. Government an easement on VVWRA property in order to remove the TCE contamination. VVWRA asserts that this easement may not be reassigned without their prior express written approval.

Airspace:

The Air Force Flight Test Center (AFFTC) at Edwards AFB stated that upon disposal of George AFB, commercial aircraft operations impinging on restricted airspace will adversely affect DOD operations. Airspace considerations should be addressed in the EIS.

Miscellaneous

- Strong support was expressed for a coordinated local planning effort to decide the future use of George AFB resources.
- DOD was encouraged to recognize VVEDA as the sole reuse authority for George AFB.
- The U.S. Small Business Administration would like to ensure that the Minority Small Business Program (Section 8 [a] of the Small Business Act) is utilized in any program of reuse for George AFB.

1.3.2 Issues Beyond the Scope of the EIS

Concerns and issues that are beyond the scope of this EIS were also expressed during the scoping process. These issues, and the reasons they are not included in this EIS, are identified below. In general, issues were determined to be beyond the scope of this EIS if they were either not significant or if they have been or are being addressed by other surveys and studies.

Installation Restoration Program. The Air Force is currently conducting an IRP that defines and implements the procedures necessary for the remediation of hazardous substance releases at George AFB. The IRP is a separate process being conducted concurrently with the analysis of the disposal and reuse EIS; final assessments and findings of the IRP are not yet completed and may not be completed for a period of up to 5 years. The steps in this process are shown in Figure 3.3-3

With the base closing and reuse plans in a conceptual state, the exact effect of IRP issues on reuse cannot be quantified with certainty at this time. The IRP, in turn, needs additional information on reuse to ensure that risk-driven remediations meet the land uses that will occur in the future. It is obvious that as planning matures and additional IRP information becomes available, much coordination will take place over the IRP and reuse issues. An in-depth consideration of IRP management and analysis procedures is beyond the scope of this EIS; however, IRP issues are discussed herein to provide a baseline for the affected environment.

The Air Force is committed to the identification, assessment, and remediation of the contamination from hazardous substances at George AFB. This commitment will assure the protection of public health as well as restoration of the environment. The public may participate in the IRP through the Community Relations Plan for the program. Information about this may be obtained through the base's Public Affairs Office. Additionally, the general public will be asked to comment on the remediations proposed for the IRP sites through a formal process for National Priorities List (NPL) facilities such as George AFB. A process, similar to the one for this EIS, will be followed in which public hearings are held on proposed cleanups and comments are taken for analysis.

Socioeconomics. Effects upon the physical or natural environment as a result of potential changes in certain socioeconomic factors that are associated with or caused by the disposal or reuse of the base are addressed within this EIS. Other socioeconomic issues, such as the region's employment base, school budgets, municipal/state tax revenues, medical care for military retirees and dependents, local governments and services, and economic effects on utility systems are beyond the scope of NEPA and CEQ requirements. Analysis of impacts associated with these issues is provided in the *Socioeconomic Impact Analysis Study*; that document will also support the base reuse decision-making process.

1.4 PUBLIC COMMENT PROCESS

The Air Force has complied with the NEPA mandate of public participation in the environmental impact analysis process primarily in two ways:

- The subject Draft EIS was made available for public review and comment in October-November 1991.
- At a public hearing held on October 17, 1991, the Air Force presented the findings of the Draft EIS and invited public comments.

All comments were reviewed and addressed, when applicable, and have been included in their entirety in Volume II of this document. Responses to comments offering new or changes to data and questions about the presentation of data are also included. Comments simply stating facts or opinions, although appreciated, did not require specific responses. The Public Comments and Responses section more thoroughly describes the comment and response process.

1.5 CHANGES TO THE DEIS

The text of this EIS has been revised, when appropriate, to reflect concerns expressed in public comments. These changes range from typographical corrections to amendments of reuse plans. The responses to the comments in Volume II indicate the relevant sections of the EIS that have been revised. The major comments received on the Draft EIS were:

- The treatment of cumulative impacts and mitigations was considered to be inadequate.
- Questions concerning the differences in the MAP used in analyzing the aviation alternatives and the MAP at buildout provided by the alternative proponents were raised.
- The treatment of water rights was considered inadequate.
- The discussion of contamination, hazardous materials, hazardous waste and cleanup was considered deficient.
- The treatment of impacts on the Mojave River, especially downstream, was considered inadequate.
- The treatment of socioeconomic impacts was considered insufficient.

Based on more recent studies or comments from the public, the following sections of the EIS have been updated or revised:

- The discussions of MAP (Sections 1.3.1, 2.2.1, 2.3.1, 4.2.3.1, and 4.2.3.2) have been revised.
- Additional information has been included in proposed airfield improvements and conceptual airport master plans (Sections 2.2.1 and 2.3.1).
- Hazardous Materials/Hazardous Waste Management (Sections 3.3 and 4.3) includes expanded discussions on the following:
  - Federal Facility Agreement (FFA) schedule
  - Impacts of the IRP process on reuse development
  - Characterization of IRP sites
  - Evaluation and effects of each IRP site relevant to each alternative's land uses
  - Concept of risk associated with certain types of development and IRP sites.
- Air quality (Section 4.4.3) has been revised to include discussion of emission credits and credit transfer.
- Where applicable, the probable success of mitigation measures has been described. The discussion was not included for some resource areas; for example, mitigation measures involving wastewater treatment are considered an engineering issue, since design modifications would be a way of handling increased demand on the facility.

1.6 RELATED ENVIRONMENTAL DOCUMENTS

The environmental documents listed below have been or are being prepared separately and address environmental issues at George AFB. These documents provided supporting information for the environmental analysis.

- *Final Environmental Impact Statement for the Closure of George Air Force Base*
- *Biological Survey of George AFB* (draft)
- *Archaeology Survey and Inventory of George AFB*
- *George AFB, World War II Buildings/Facilities Architectural and Historical Evaluation* (draft)
- *Environmental Assessment, Impacts of Air Warrior Relocation from George AFB*
- *Environmental Assessment, Cumulative Impacts of Aircraft Realignments at George AFB* (draft)
- IRP Bibliography (Appendix E).

1.7 RELEVANT FEDERAL, STATE, AND LOCAL STATUTES, REGULATIONS, AND GUIDELINES

Federal, state, and local statutes, regulations, and guidelines with which the recipients of George AFB property and cooperating agencies must comply, as related to this disposal and reuse EIS, are presented in Table 1.7-1. Federal permits, licenses, and entitlements which may be required by reusers or developers are presented in Table 1.7-2.

Table 1.7-1. Relevant Federal, State, and Local Statutes, Regulations, and Guidelines
Page 1 of 4

Resource	Project Activity	Regulation/Authority	Agency
Air Quality	Changes in vehicle traffic levels or aircraft operations; changes in emissions from construction activity or the establishment or removal of any stationary source of emissions	The Clean Air Act, 42 U.S.C. §§ 7401 et seq.; 40 C.F.R. Parts 50-87	U.S. Environmental Protection Agency; California Environmental Protection Agency
		The California Clean Air Act, California Health & Safety Code Chapter 156B	California Air Resources Board
		San Bernardino County APCD Rules and Regulations	San Bernardino County Air Pollution Control District
	Analysis of environmental impact of development or improvement of a public airport	Federal Aviation Administration Order 5050.4a	U.S. Department of Transportation - Federal Aviation Administration
	Improvement of a federally funded highway project	23 U.S.C. § 109 (Standards for Federal Aid Highways); The Clean Air Act, 42 U.S.C. § 7506; Air Quality Conformity and Priority Procedures for use in Federal-Aid Highway and federally funded Transit Programs, 23 C.F.R. Part 770	U.S. Department of Transportation - Federal Highway Administration
Airspace Use	Activities that may affect airspace use and air traffic procedures	Federal Aviation Administration (FAA) Handbooks 7400.2C and 8260.3	U.S. Department of Transportation-Federal Aviation Administration
Biological Resources	Consultation regarding federal or federally permitted projects to impound, divert, or control surface waters with a total surface area greater than 10 acres	Fish and Wildlife Coordination Act, 16 U.S.C. §§ 1661 et seq.	Department of Interior - U.S. Fish and Wildlife Service
	Dredge and fill activities in jurisdictional wetlands	Clean Water Act, 33 U.S.C. §§ 1251 et seq.; Executive Order 11990 (Protection of Wetlands)	U.S. Fish and Wildlife Service; U.S. Environmental Protection Agency; Department of Defense - Army Corps of Engineers; California Environmental Protection Agency
	Activities that may affect habitat of migratory birds	Migratory Bird Treaty Act 16 U.S.C. §§ 701 et seq.; 50 C.F.R. Part 21	Department of Interior - U.S. Fish and Wildlife Service

Table 1.7-1. Relevant Federal, State, and Local Statutes, Regulations, and Guidelines
Page 2 of 4

Resource	Project Activity	Regulation/Authority	Agency
Biological Resources (con't)	Reservoir development and stream modification projects including specific fish and wildlife habitat improvements	Watershed Protection and Flood Prevention Act, 16 U.S.C. §§ 1001 et seq., 33 U.S.C. § 701-1	U.S. Department of Agriculture - Soil Conservation Service
	Project activities that could affect stream beds	California Fish and Game Code, Sections 1601 and 1603	California Department of Fish and Game
	Project activities that may affect state listed endangered or threatened species	Endangered Species Act, as amended	U.S. Fish and Wildlife Service
	Project activities that may affect state listed endangered or threatened species	California Endangered Species Act	California Department of Fish and Game
	Transportation programs or projects that may require the use of any park, recreation area, or wildlife or waterfowl refuge of national, state, or local significance	Department of Transportation Act of 1966, 49 U.S.C. § 303(c) (formerly 49 U.S.C. § 1653 (f) 1982)	U.S. Department of Transportation
	Ensuring that necessary actions are taken for the prevention, control, and abatement of environmental pollution from federal facilities and activities under the control of the agency	Executive Order 12088 (Federal Compliance with Pollution Control Standards)	Department of Defense - U.S. Air Force
Cultural Resources	Project activities that may affect properties with archaeological, historic, architectural, or cultural value that are listed or are eligible for listing in the National Register of Historic Places	Historic Sites Act, 16 U.S.C. §§ 461 et seq.; National Historic Preservation Act, 16 U.S.C. §§ 470 et seq.; Protection of Historic and Cultural Properties, 36 C.F.R. Part 800; National Register of Historic Places, 36 C.F.R. Part 60; California Historic Preservation Act. Determinations of Eligibility for Inclusion in the NRHP, 36 C.F.R. Part 63; The Secretary of the Interior's Standards for Historic Preservation Projects, 36 C.F.R. Part 68 (Executive Order 11593)	Department of Interior - National Park Service; Advisory Council on Historic Preservation, State Historic Preservation Office

Table 1.7-1. Relevant Federal, State, and Local Statutes, Regulations, and Guidelines
Page 3 of 4

Resource	Project Activity	Regulation/Authority	Agency
Cultural Resources (cont'd)	Transportation programs or projects that will require the use of or have significant impacts on land of an historic site of national, state, or local significance	Department of Transportation Act of 1966 (Public Law 89-670) 49 U.S.C. 303, Section 4(f)	U.S. Department of Transportation
Land Use	Disposal of dwellings	McKinney Homeless Assistance Act, 42 U.S.C. § 11411	Department of Housing and Urban Development - Department of Health and Human Services
	Transfer of federal properties comprising George Air Force Base	Federal Property Administrative Services Act, 40 U.S.C. § 471 et seq.; Base Closure and Realignment Act of 1988, Public Law 100-526	U.S. Environmental Protection Agency; Department of Defense - U.S. Air Force
	Control of height of airport facilities	FAR Part 11	U.S. Department of Transportation - Federal Aviation Administration
Noise	Aviation	Housing and Urban Development and U.S. Environmental Protection Agency guidelines	U.S. Department of Transportation - Federal Aviation Administration
		California Noise Standards, Title 21, Subchapter 6.	California Department of Transportation, Department of Aeronautics
Waste Management	Remediation of past discharges of hazardous substances	Comprehensive Environmental Response, Compensation and Liability Act, 42 U.S.C. §§ 9601et seq.; Executive Order 12580 (Superfund Implementation)	U.S. Environmental Protection Agency; Department of Defense - U.S. Air Force; California Environmental Protection Agency
	Generation and temporary storage of hazardous substances	Resource Conservation and Recovery Act, 42 U.S.C. §§ 6901 et seq.	U.S. Environmental Protection Agency; Department of Defense- U.S. Air Force, California Environmental Protection Agency
	Identification of asbestos-containing materials in base facilities	Air Force Policy - Management of Asbestos at Closing Bases.	Department of Defense - U.S. Air Force
	Disposal of pesticides and pesticide containers	Federal Insecticide, Fungicide and Rodenticide Act, 7 U.S.C. §§ 136 et seq.	U.S. Environmental Protection Agency; Department of Defense - U.S. Air Force

Table 1.7-1. Relevant Federal, State, and Local Statutes, Regulations, and Guidelines
Page 4 of 4

Resource	Project Activity	Regulation/Authority	Agency
Waste Management (cont'd)	Closure of underground storage tanks	Resource Conservation and Recovery Act, 42 U.S.C. §§ 6991 - 69911	U.S. Environmental Protection Agency; Department of Defense - U.S. Air Force
	Location of PCB-contaminated electrical equipment	PCB Transformer Fire Rule, 50 Fed. Reg. 29, 177	California Fire Marshall
Water	Establishment of safe water regulations and maximum contaminant levels applicable with minor exceptions to public systems	Safe Drinking Water Act (Public Law 95-523), as amended, Subchapter XII, Safety of Public Water Systems, Part B	U.S. Environmental Protection Agency
	Discharge of wastewater	Clean Water Act, 33 U.S.C. §§ 1251 et seq.; The National Pollution Elimination Discharge System, 40 C.F.R. Part 122	U.S. Environmental Protection Agency; Department of Defense - U.S. Air Force; California Environmental Protection Agency
	Discharge of dredge or fill material into waters of the United States	Clean Water Act, 33 U.S.C. §§ 1251 et seq.; 40 C.F.R. Part 230	Department of Defense - Army Corps of Engineers

Table 1.7-2. Federal Permits, Licenses, and Entitlements Potentially Required for Reusers or Developers of Disposed Base Property
Page 1 of 2

Federal Permit, License, or Entitlement	Typical Activity, Facility, or Category of Persons Required to Obtain the Federal Permit, License, or Entitlement	Regulatory Agency	Authority
Title V permit under the Clean Air Act (CAA), as amended by the 1990 Clean Air Act Amendments	Any major source (source that emits more than 100 tons/year of criteria pollutant in nonattainment area for that pollutant or is otherwise defined in Title I of CAA as a major source); affected sources as defined in Title IV of CAA; sources subject to Section 111 regarding New Source Performance Standards; sources of air toxics regulated under Section 112 of CAA; sources required to have new source or modification permits under Parts C or D of Title I of CAA; and any other source designated by EPA regulations	U.S. Environmental Protection Agency (EPA); applicable state Air Pollution Control District if state has EPA-approved air quality control program	Title V of CAA
National Pollutant Discharge Elimination Control System (NPDES) permit	Discharge of pollutant from any point source into waters of the United States	U.S. EPA; State Water Quality Control Board	Section 402 of Federal Water Pollution Act, 33 U.S.C.§ 1342; California Water Code § 13376
Section 404 (Dredge and Fill) Permit	Any project activities resulting in the discharge of dredged or fill material into bodies of water, including wetlands, within the United States.	U.S. Army Corps of Engineers, in consultation with U.S. EPA	Section 404 of Federal Water Pollution Act, 33 U.S.C. § 1344
Underground Injection Control (UIC) Permit	Owners or operators of certain types of underground injection wells	U.S. EPA; California EPA	Safe Drinking Water Act, 42 U.S.C. § 300h(b); 40 CFR Part 144; California Water Code §§ 13382, 13382.5
Hazardous waste treatment, storage, or disposal (TSD) facility permit	Owners or operators of a new or existing hazardous waste TSD facility	U.S. EPA: California EPA	Resource Conservation and Recovery Act (RCRA) as amended, 42 U.S.C. § 3005; 40 CFR Part 270; California Health & Safety Code § 25201

Table 1.7-2. Federal Permits, Licenses, and Entitlements Potentially Required for Reusers or Developers of Disposed Base Property
Page 2 of 2

Federal Permit, License, or Entitlement	Typical Activity, Facility, or Category of Persons Required to Obtain the Federal Permit, License, or Entitlement	Regulatory Agency	Authority
EPA ,manifest identification number	Generators or transporters (off-site transport) of hazardous waste	U.S. EPA	40 CFR § 262.10 (generators); 40 CFR Part 263, Subpart B (transporters)
Antiquities permit	Excavation and/or removal of archaeological resources from public lands or Indian lands and carrying out activities associated with such excavation and/or removal	U.S. Department of the Interior, National Park Service	Archaeological Resource Protection Act of 1979, 16 U.S.C. § 470cc
Endangered Species Act § 10 permit	Taking endangered or threatened wildlife species; engaging in certain commercial trade of endangered or threatened plants or removing such plants on property subject to Federal jurisdiction	U.S. Department of the Interior, Fish and Wildlife Service	Section 10 of Endangered Species Act, 16 U.S.C. § 1539; 50 CFR Part 17, Subparts C,D,F, & G
Airport Operating Certificate	Operating a land airport serving any scheduled or unscheduled passenger operation of air carrier aircraft designed for more than 30 passenger seats	U.S. Department of Transportation, Federal Aviation Administration	Federal Aviation Act of 1958, 49 U.S.C. App. § 1432

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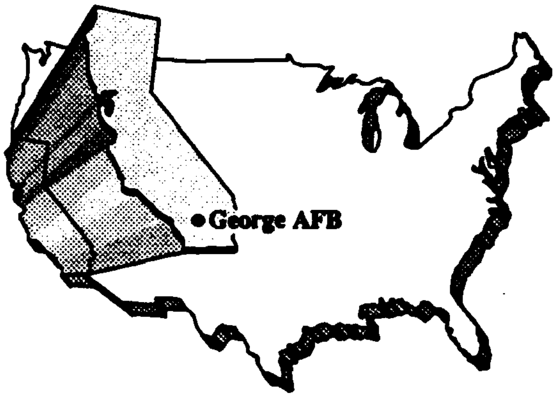


CHAPTER 2
ALTERNATIVES INCLUDING THE PROPOSED ACTION

2.0 ALTERNATIVES INCLUDING THE PROPOSED ACTION

This section describes the Proposed Action, reasonable alternatives to the Proposed Action, and the No-Action Alternative. In addition, potential federal transfers of George AFB properties and facilities from DOD to other federal agencies are described, as are independent reuse options that are not part of a complete plan. Other alternatives that were identified but eliminated from further consideration are briefly described. The potential environmental impacts of the Proposed Action and alternatives are summarized in table form.

The potential land acquisition identified under each alternative is described if (1) the parcel's proposed use and/or development is expected to occur within the 20-year period covered by the analysis, (2) the area is intended to be set aside, as in the case of future airport expansion, or (3) the area is considered a buffer zone to prevent future non-compatible land uses. Specific discussions on land acquisitions subject to environmental analysis are found within the appropriate land use category for each alternative.

2.1 INTRODUCTION

BCRA legislates the delegation of federal authority and consultative requirements of the Administrator of General Services to the Secretary of Defense with respect to the excess and surplus real property and facilities located at a military installation closed or realigned under this act. Federal property management regulations (FPMR) address disposal methods associated with base closure. Disposal methods include transfer to another federal agency, public benefit conveyance, negotiated sale to state or local government, and public sale by auction or sealed bid. Because these disposal methods are valid in the conveyance of George AFB either in its entirety or in some form of parcelization, it is possible that different methods of disposal will be assigned to different parcels on George AFB.

Provisions of BCRA and FPMR require that the Air Force first notify other DOD departments that George AFB is scheduled for disposal. Any proposals from these departments for the reuse of George AFB are given priority consideration, if the department is willing to purchase the property.

Under the provisions of FPMR which implement the Stewart B. McKinney Homeless Assistance Act (P.L. 100 - 77), the Department of Housing and Urban Development (HUD) is required to determine the suitability of underutilized, unutilized, and/or excess building and land for use by homeless assistance providers.

The Air Force has reported George AFB to HUD as "to be excess on or about December 1992." HUD then reported the potential availability of facilities at George AFB in the June 21, 1991, Federal Register. After publication, homeless assistance providers had 60 days to make expressions of interest on suitable property to the Department of Health and Human Services (HHS) and to receive a lease application to be completed in 90 days. HHS is required to determine, within 25 days, the suitability of the homeless assistance provider. Homeless Assistance Providers determined to be suitable by HHS may be able to lease available property prior to closure of the base. The minimum term of a lease is one year. If the Air Force determines a building or a parcel of land to be surplus, the homeless assistance providers will be provided an application to acquire the property by deed.

Prior to either leasing or deeding the property, the Air Force may consider other federal uses and other important national needs. However, in deciding the disposition of surplus property, a priority of consideration will be given to uses which assist the homeless. Subsequently the property will be made available to federal, state, and local agencies and the public.

Three reuse plans were provided to the Air Force during the scoping meeting for the disposal and reuse of George AFB. Each of these proposals addressed redevelopment focusing on civilian airports of various magnitude: (1) a commercial airport, (2) an international airport, and (3) a general aviation center. Although each of the plans offered different levels of detail, all three were conceptual in nature. In order to accomplish impact analysis, a set of general assumptions was made. These assumptions include employment and population changes arising from implementation of each reuse plan, consistent land use designations for similar reuse options, proportion of ground disturbance anticipated for each land use type, transportation and utility effects of each proposal as a function of increased population growth due to redevelopment, and anticipated phasing of the various elements of each reuse plan (as measured at the closure baseline, and at the baseline plus 5, 10, and 20 years, respectively). Details regarding the generation of these assumptions are found in Appendix F, Methods of Analysis. Specific assumptions developed for individual reuse plans are identified in the discussion of each proposal, within Sections 2.2 and 2.3.

Two additional alternatives were developed by the Air Force in order to provide analysis of the widest range of potential reuse options. The Commercial Airport with Residential Alternative was modelled after the Proposed Action, with the primary difference being the retention of a residential component. The Non-Aviation Alternative was developed to provide an analysis of a plan whose components represent highly marketable reuse options without the continuation of an operating airfield.

2.2 DESCRIPTION OF PROPOSED ACTION

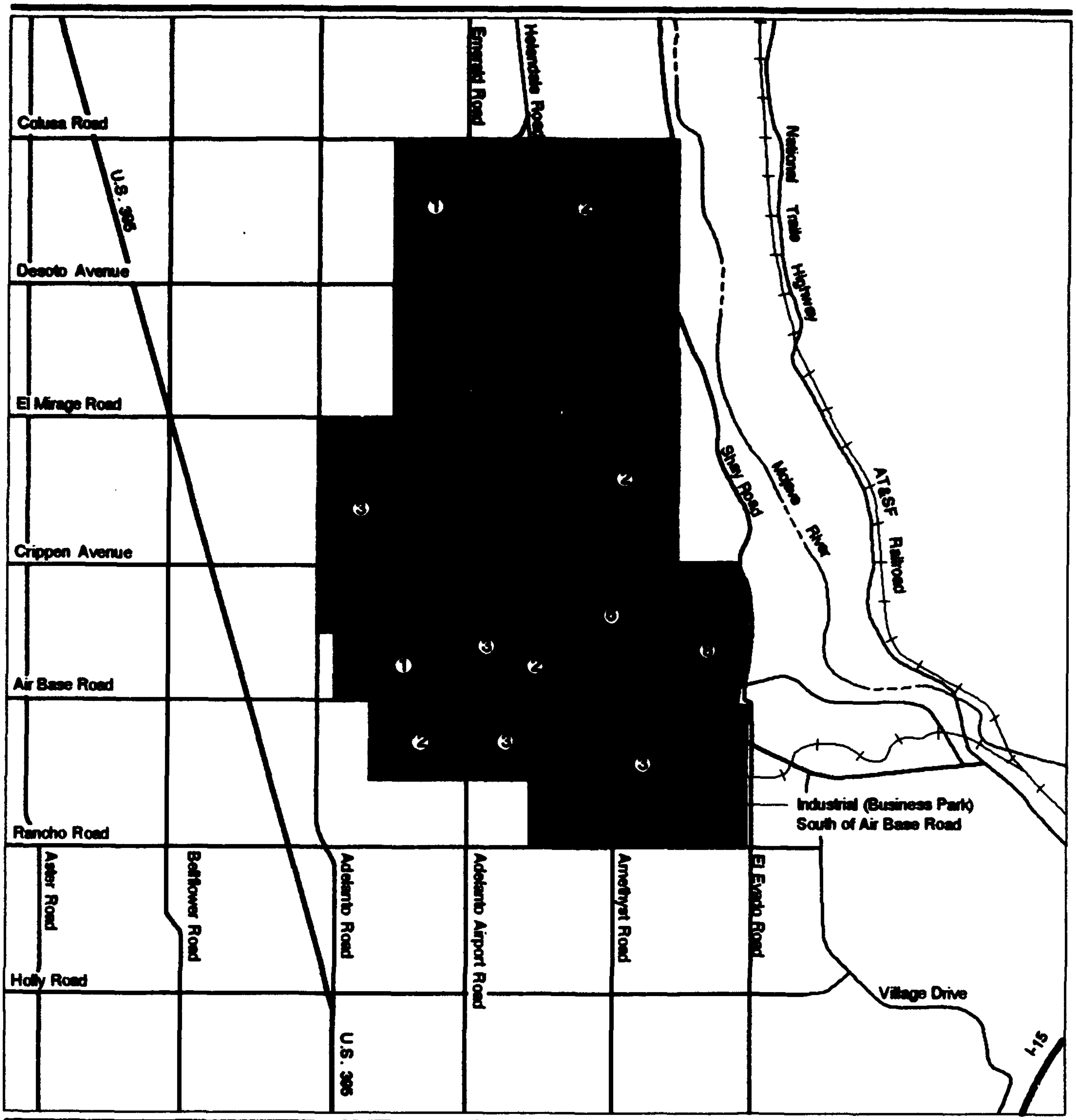
VVEDA was formed as a Joint Powers Authority (JPA) (California Community Redevelopment Law [Health and Safety Code Section 3300 et seq.]) in September 1989 in order to obtain title to George AFB and its facilities. VVEDA consists of a partnership of local jurisdictions: the county of San Bernardino, the city of Victorville, the city of Hesperia, and the town of Apple Valley. VVEDA, the recognized reuse authority, has developed plans for the reuse of George AFB which the Air Force has adopted as the Proposed Action. The city of Adelanto, another jurisdiction within the overall George AFB environs, removed itself from VVEDA early in the planning process, and pursued its own plan for the purchase and reuse of the base. The International Airport Plan, as proposed by the city of Adelanto, is described in Section 2.3.1.

Upon announcement of base closure, the county of San Bernardino, and later VVEDA upon its JPA designation, contracted with several consulting firms and agencies to prepare technical reports pertinent to the development of a reuse plan. Among the areas addressed were the following:

- Airport development
- Marketing analysis and strategy
- Existing land use
- Traffic analysis
- Building inventory.

Results of these technical studies are being compiled into the VVEDA Reuse Plan. Area-specific land uses have been identified for development on the George AFB property and on adjoining parcels marked for acquisition in VVEDA's proposal for reuse as an evolving commercial airport. The Air Force has included this plan as the Proposed Action for the purpose of analyzing environmental impacts. Two additional alternatives analyzed by VVEDA early in their planning process are presented in Section 2.4 as alternatives eliminated from further consideration.

Under the Proposed Action (Figure 2.2-1), the reuse of George AFB would center around a regional commercial and general aviation airport. The FAA's National Plan of Integrated Airport Systems (NPIAS) 1990-1999 identifies the need for a new general aviation airport in the Victorville area. The proposed establishment of a civilian aviation reuse at George AFB would be consistent with the NPIAS's goal for a new airport. The total acreage of each land use category is shown in Table 2.2-1. Off-base property acquisition needs are discussed in the applicable land use category descriptions, as described in detail below (all acreages used in this document are approximate). Table 2.2-2 describes the acres disturbed by construction in each of the three phases (1993-1998, 1998-2003, and 2003-2013) after base closure for the Proposed Action as well as the other alternatives.



EXPLANATION

1 Airfield
2 Aviation Support
3 Industrial
4 Institutional * (Medical)
5 Institutional * (Education)
6 Commercial (Office/Business Park)
7 Residential*
8 Public/Recreation
9 Agriculture*
10 Vacant Land*
Slopes>15%
Base Boundary
Abandoned Runway
* Not Applicable

0 1/4 1/2 1 Mile

Proposed Action (Commercial Airport)

Figure 2.2-1

Table 2.2-1. Land Use Acreage - Proposed Action

Land Use	Acreage: Base Property	Acreage: Off-Base Property Acquisition
Airfield	1,575	338
Aviation Support	746	1,879
Commercial		
Office/Business Park	612	
Industrial/Business Park	916	135
Industrial	850	
Recreation/Vacant Land	297	
Golf Course	77	
Subtotal	5,073	2,352
Total	7,425	

VVEDA provided the following types of data for analysis:

- Proposed reuse options for the airfield
- Conceptual plan for civilian use of the aviation facilities using the FAA Airport Reference Code (ARC) D-5
- Some anticipated construction/demolition activities
- A general listing of anticipated airport tenants
- Proposed acquisitions
- General guidelines for projected employment
- Trip generation rates for aviation areas
- Phasing plans for aviation improvement
- Recommended use of existing buildings
- Long-range development concept
- Projected air passenger demand.

The following assumptions were used to expand upon the analysis:

- Acreage figures for proposed land uses
- Projected flight operations and fleet mixes through 2013
- Fleet mix representation of a minimum of 50 percent of applicable Stage III aircraft in 2003 and all Stage III in 2013
- Construction/demolition activities
- Employment and population projections through 2013 for Victor Valley and the 2-county region of influence (ROI)
- Traffic generation and daily trip projections through 2013
- Utility requirement projections through 2013
- Areas disturbed by construction/demolition
- Phasing plans for total reuse through 2013
- Proposed transportation systems.

Table 2.2-2. Disturbed Acres in 5, 10, and 20 Year Intervals

	1993-1998		1998-2003		2003-2013		Total	
	On-Base	Off-Base	On-Base	Off-Base	On-Base	Off-Base	On-Base	Off-Base
Proposed Action								
Airfield	68					101	68	101
Aviation Support	130		155		238		523	
Commercial								
Office/Business Park	135		135		281		551	
Industrial								
Aviation-Related	154		140		301		595	
Business Park		101	357		330		687	101
Recreation	15						15	
Totals	502	101	787		1,150	101	2,439	202
International Airport Alternative								
Airfield			876	3,169			876	3,169
Aviation Support		268		268		690		1,226
Commercial								
Hotel	477						477	
Industrial								
General	687						687	
Business Park			124		125		249	
Aviation-Related			217			186	217	186
Totals	1,164	268	1,217	3,437	125	876	2,506	4,581
Commercial Airport with Residential Alternative								
Aviation Support	67		67		69		203	
Commercial								
Retail	14		9				23	
Industrial			244		490		734	
Institutional								
Medical	1						1	
Educational	22						22	
Public	12						12	
Residential	314		565		694		1,573	
Totals	430		885		1,253		2,568	
General Aviation Center Alternative								
Aviation Support	220						220	
Totals	220						220	
Non-Aviation Alternative								
Commercial								
Retail			9		9		18	
Industrial								
Business Park	165		165		330		660	
Institutional								
Medical	1						1	
Educational	69		69		144		282	
Public	12						12	
Recreation	4						4	
Vacant Land	15						15	
Residential	709		921		1,140		2,770	
Totals	975		1,164		1,623		3,762	

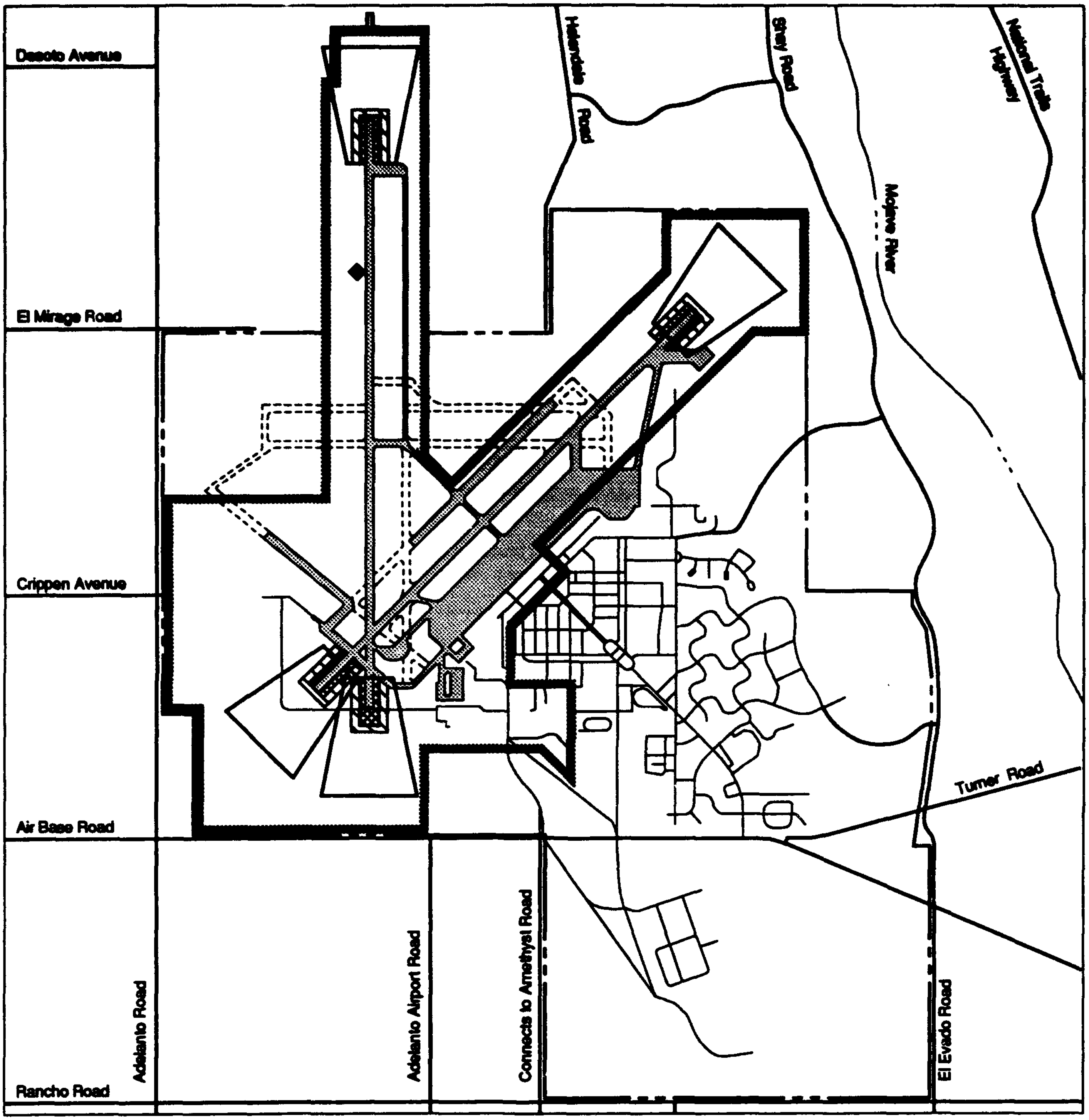
2.2.1 Airfield

The airfield land use category includes 1,575 acres on base. It encompasses the following proposed reuse options depicted in the VVEDA Airport Master Plan: runways, taxiways, runway protection zones, terminal, control tower, fire station, and terminal parking (Figure 2.2-2). The airfield would be used primarily by passenger aircraft (air carrier and commuter), aircraft maintenance and general aviation aircraft. Additional activities requiring airfield support include the transport of air cargo, and flights associated with the maintenance of all types of aircraft. (Specific facilities required for general aviation and maintenance functions are discussed under Section 2.2.2, Aviation Support).

An area of 338 acres of off-base property has been designated for acquisition by VVEDA as part of the airfield. This parcel is located to the north and along the western edge of Runway 17/35. It would be set aside for future extension of the runway, if necessary, and provides an increased safety zone for operations within the 20-year period of analysis. The total area to be disturbed by construction would be 68 acres on site and 101 acres off site.

A conceptual plan for the civilian use of the aviation facilities at George AFB was developed and provided in the Airport Master Plan. The conceptual plan used the FAA Advisory Circular 150/5300-13 in developing the layout of the characteristics (e.g., dimensions, separations, and clearances) of airfield elements to allow current operation of all commercial aircraft. The airfield as designed is capable of handling widebody aircraft, such as the Boeing 747. The following important features of the airfield are cited in the airport development plan:

- The existing runways would be retained at their current length and width, although they will be repaired, as required.
- Some unused pavements would be abandoned or removed.
- New taxiways would be constructed as follows:
  - parallel to the western side of the north-south (primary) runway
  - at the northern end of the primary runway for existing aircraft
  - west of the primary runway to serve aviation-related industrial areas
  - parallel to the crosswind (secondary) runway at its northeast edge to serve aviation support areas
  - east of the secondary runway to support aviation support areas.
- Runway Protection Zones (RPZs) located at either end of each runway would be kept free of structural development except for required navigational aids. These zones would provide an enlarged safety area, yet retain the possibility of lengthening the runways at a later date.
- Flexibility exists within the layout to add runways parallel to either the primary or secondary runway if the airport capacity requires expansion.



EXPLANATION

- Airport Boundary
- Airfield Pavement
- Runway Safety Area
- Runway Object Free Area
- Runway Protection Zone
- Instrument Landing System (ILS) Glide Slope Site
- Abandoned Runway
- Base Boundary

0 750 1500 3000 Feet

Conceptual Airport Master Plan - Proposed Action

Figure 2.2-2

A terminal area would be located at the intersection of Worley and Cory Boulevards, adjacent to the large aircraft parking ramps. All terminal functions (aircraft parking, terminal building, vehicle parking, fire station, and air traffic control tower) would be provided in one central location. The plan for the terminal is flexible. Although intended to meet passenger forecasts for a 20-year period (up to 15 MAP by 2013), expansion of the terminal area beyond those projected numbers is feasible if the need arises. The analysis is based on 1 MAP by 2013, the VVEDA anticipated passenger load projected for that year.

Services related to general aviation would be provided along the secondary runway, adjacent to the terminal area. Associated facilities are discussed in Section 2.2.2, Aviation Support.

The existing facilities would be reused to the maximum extent possible, especially for aviation-related functions. However, some buildings would have to be removed or modified. Nearly all new construction associated with the airfield land use zone would be in the terminal area. Anticipated construction/demolition activities include:

- Removal of all buildings within the boundaries of Sabre Boulevard, Calico, Weasel, and Readiness streets, except Building 350, for vehicle access and parking
- Construction of a new passenger terminal (approximately 67,000 square feet) in the location of existing Buildings 691, 692, and 695, which would be demolished.

The majority of rehabilitation and construction within the airfield is expected to take place soon after base closure. Existing buildings (e.g., 717, 718, or 720) could be used as a temporary terminal until the new facility is complete.

The following airfield improvements are proposed and would be developed in accordance with FAA Advisory Circulars, standards, and recommendations:

- Reconstruct, strengthen, and recommission existing Runway 17/35, 10,050 feet by 150 feet with high intensity runway lighting (HIRL).
- Reconstruct, strengthen, and recommission existing Runway 3/21, 9,116 feet by 150 feet with HIRL.
- Maintain and strengthen the existing taxiway and apron system and construct additional lighted taxiways and aircraft run-up aprons.
- Install precision approach path indicator (PAPI) systems for Runways 3, 17, 21, and 35.
- Install runway end identifier lights (REIL) on Runways 3, 21, and 35.
- Establish two helicopter landing areas.
- Establish a full precision instrument landing system (ILS) including runway visual range (RVR) with necessary off-airport marker facilities to Runway 17. The ILS would consist of a localizer and guide slope and an approach light system with sequenced flashing lights.

- Establish a nonprecision instrument (NPI) approach to Runways 3, 17, and 35.
- Establish a VHF omnidirectional range (VOR)/distance measuring equipment (DME) with an off-airport compass locator outer marker or similar facilities.
- Retain an air traffic control tower (ATCT).
- Construct aircraft rescue and fire fighting facilities.
- Establish RPZs to meet FAA criteria.
- Retain and construct commercial passenger handling facilities, including auto parking.
- Construct taxiways, aprons, buildings, and hangars for aircraft maintenance and general aviation operations.
- Improve and construct on-airport roads to accomodate aviation development and facilities.

The above-mentioned off-airport compass locator outer marker is a critical component of an ILS. The marker would be located 4 to 7 nautical miles (nm) from the threshold of the ILS runway (Runway 17/35). The outer marker is a low-powered transmitter that provides a nondirectional signal used for directional guidance to the initial segment of the ILS approach, as well as a signal that activates aural and visual indicators in the aircraft for guidance in the final approach. The outer marker plot is approximately 180 by 60 feet, including access road and easement. The device consists of an antenna mounted on a wood pole with a prefabricated equipment shelter and battery standby power. All equipment would be enclosed within a 7-foot chain link fence. A similar facility could be needed to establish the proposed nonprecision approaches.

The exact site of the outer marker or markers under the Proposed Action has not yet been selected. They would likely be situated on private property; a real estate interest would be acquired for this land. An environmental survey would be conducted as part of the siting process to avoid potential environmental impacts resulting from construction of the marker.

Passenger service by air carrier and commuter airlines makes up a substantial proportion of flight operations proposed for the reuse of George AFB. Although freight and mail would be transported as "belly cargo" in the fuselage of passenger aircraft, there does not appear to be a significant demand for dedicated air-cargo service in the Victor Valley area. General aviation activities anticipated at the commercial airport include corporate flying, private or pleasure flying, and instructional flying. In addition, other potential airport tenant operations could include airline flight crew training and activities associated with military law enforcement or other government agencies. Table 2.2-3 lists the projected flight operations assumed for the Proposed Action for the baseline year following closure (1993), and for the periods 5, 10, and 20 years beyond baseline (1998, 2003, and 2013, respectively). Because of the

Table 2.2-3. Projected Flight Operations - Proposed Action

Year	Operation	Fleet Mix			Annual Operations	
1993	Airline Training		100%	B-747-200	Total	10,000
1998	Air Passenger	Air Carrier:	5%	B-727-200; DC-9-30		3,200
			45%	B-737-300*		
			45%	B-757-200*		
			5%	B-747-200; DC-10-30*; L-1011-500*		
		Commuter:	25%	Beech 1900		15,000
			25%	SAAB 340		
			25%	DHC-6		
			25%	Embraer Brasilia		
	Airline Training		100%	B-747-200		10,000
	General Aviation		67%	Single Engine		16,000
			22%	Multi Engine		5,200
			7%	Turbo Prop/Jet		1,700
			4%	Helicopter		900
	Aircraft Maintenance		45%	B-737-300*		1,600
			5%	B-747-200		
			45%	B-757-200*		
			5%	B-767-200*		
					Total	53,600
2003	Air Passenger	Air Carrier:	5%	B-727; DC-9-30		5,200
			45%	B-737-300*		
			45%	B-757-200*		
			5%	B-747-200; DC-10-30*; L-1011-500*		
		Commuter:	25%	Beech 1900		16,100
			25%	SAAB 340		
			25%	DHC-6		
			25%	Embraer Brasilia		
	Airline Training		100%	B-747-200		10,000
	General Aviation		65%	Single Engine		20,000
			23%	Multi Engine		7,100
			7%	Turbo Prop/Jet		2,200
			5%	Helicopter		1,500
	Aircraft Maintenance		45%	B-737-300*		2,600
			5%	B-747-200		
			45%	B-757-200*		
			5%	B-767-200*		
					Total	64,700
2013	Air Passenger	Air Carrier:	5%	MD-83*		8,900
			45%	B-737-300*		
			45%	B-757-200*		
			5%	B-747-200*; DC-10-30*; L-1011-500*		
		Commuter:	25%	Beech 1900		14,200
			25%	SAAB 340		
			25%	DHC-6		
			25%	Embraer Brasilia		
	Airline Training		100%	B-747-200*		10,000
	General Aviation		64%	Single Engine		24,900
			24%	Multi Engine		9,300
			7%	Turbo Prop/Jet		2,700
			5%	Helicopter		2,000
	Aircraft Maintenance		45%	B-737-300*		4,000
			5%	B-747-200*		
			45%	B-757-200*		
			5%	B-767-200*		
					Total	76,000

*Represents Stage III Aircraft.
Source: Operations based on estimates from commercial airport forecast (P&D Technologies, 1990).

proposed elimination of Stage II aircraft, the fleet mix for 2003 represents a minimum of 50 percent applicable Stage III aircraft. The fleet mix for 2013 would consist of all Stage III aircraft.

The primary runway is the north-south Runway 17/35. An estimated 50 percent of all flight operations would utilize this runway. The remaining operations are expected to use the northeast-southwest trending crosswind Runway 03/21.

Approximately 93 percent of all operations are likely to occur between 7 a.m. and 10 p.m. The remaining 7 percent would occur between 10 p.m. and 7 a.m. As an airport authority, VVEDA would operate the commercial airport. It would also assume the role of a redevelopment agency, and manage the marketing activities for the airport and associated properties.

2.2.2 Aviation Support

The aviation support land use consists of 746 acres within the base boundaries designated as areas for the support of general aviation and government agency usage. The proposed training for flight crews of widebody aircraft could also be supported in this zone. The primary locations of aviation support (696 acres) to be developed within the 20-year analysis period lie on either side of the northern section of the crosswind runway. A 50-acre parcel north of Air Base Road will continue to be used in its present capacity for fuel storage and distribution. The total area to be disturbed by construction would be 523 acres on site.

The largest off-base area (1,879 acres) proposed for acquisition by VVEDA is for aviation support and consists of two parcels. The larger parcel (1,605 acres) lies to the east of Runway 17/35. The smaller parcel is the 274-acres south of Air Base Road currently under avigational easement to George AFB. Specific development is not identified for these parcels within 20 years. They are intended to act as a protective buffer between the airfield and future, possibly incompatible, uses. These areas also provide room for expansion if the predicted capacity of 15 MAP is exceeded.

In addition to the airfield, some or all of the aviation support land use zones would probably fall under the jurisdiction of the airport authority. The development and operations of the aviation support area would, thus, be managed in accordance with FAA and other applicable statutes.

2.2.3 Commercial

The commercial land use zone covers 612 acres of on-base property adjacent to the northern edge of Air Base Road. Reuse for this parcel has been identified as office/business park. This would require removal of existing base housing to provide space for proposed office complexes. No other details have yet been

provided concerning plans for this area. The total area to be disturbed by construction would be 551 acres on site.

2.2.4 Industrial

The area identified for industrial land use is 1,766 acres of on-base property. Both aviation industrial and industrial/business park development are proposed.

Aviation-related uses are planned for 850 acres on either side of the southern portion of the crosswind runway. Potential activities that could make use of the facilities in this area include aircraft overhaul and maintenance, modification, manufacturing, and subassembly; aeronautics research and development and testing; law enforcement; brushfire fighting (with water-drop aircraft); and drug enforcement.

The locations of the aviation-related industrial areas minimize conflict with aircraft or vehicle movement. Existing hangars and repair shops could be reused with little or no modification. Parcels of various sizes would be made available to potential users.

An industrial business park is proposed for the 916-acre parcel south of Air Base Road. Potential uses include general office space, research and development endeavors, and related activities. This parcel would be developed in two phases (one per decade), with roughly 450 acres developed in each phase.

All development in the industrial parcels west of the primary runway (650 acres), north of Air Base Road (200 acres), and south of Air Base Road (916 acres) would consist of new construction. The plan projects 1.74 million square feet of structural floor space for the western parcel and 4.35 million square feet of floor space for the first phase of development of the southern parcel. Over the 20-year period of analysis, 8.71 million square feet of structural floor space is expected to be developed in the southern industrial land use zone. The total on-site area to be disturbed by construction would be 1,282 acres.

Off-base land acquisition, amounting to 135 acres, has been proposed under the industrial land use. This parcel lies south of Air Base Road, contiguous to the western edge of the industrial/business park and the eastern edge of the aviation support parcel now under easement to George AFB. Purchase of this property by VVEDA would allow greater control over land use planning and improve upon circulation among the various land use zones. The total off-site area to be disturbed by construction would be 101 acres.

2.2.5 Recreation/Vacant Land

The proposed recreation/vacant land use zone consists of 297 acres. The existing golf course, covering another 77 acres, is considered a subset of this

land use category. The total area to be disturbed by construction would be 15 acres.

2.2.6 Transportation

Ground access has been established in the plan throughout the aviation support and industrial land use areas adjacent to the airfield. In addition to the existing main gate and residential gate entrances, an access road west of the main gate is also proposed to serve the industrial area west of the primary runway. All three access roads would intercept Air Base Road. A perimeter road would encircle the proposed airport development area. Relocation of the existing perimeter road would allow access to the northeast portion of the airport. The dedicated airport access road would enable industrial users to avoid using Adelanto Road.

2.2.7 Employment and Population

The Proposed Action would generate both direct jobs (e.g., airport and aviation-related employees, industrial and commercial personnel, etc.) on-site and indirect jobs (e.g., retail/commercial, recreational, food services, etc.) in San Bernardino and Riverside counties (ROI). Approximately 25,400 direct jobs and nearly 25,700 indirect jobs are likely to be generated in the ROI by the year 2013. This represents a 54-percent increase over closure baseline employment levels. Employment impacts are shown in Table 2.2-4.

Table 2.2-4. ROI Project-Related Employment and Population Effects – Proposed Action

	Closure	1998	2003	2013
Employment	68	18,350	36,017	51,077
Direct	50	9,100	17,856	25,391
Indirect	18	9,250	18,161	25,686
Population		9,405	19,610	30,726

Employment increases would be accompanied by population increases. The ROI population is expected to increase by more than 30,700 persons over the closure baseline by the year 2013 as a result of the Proposed Action. This represents a 9 percent increase over post-closure population projections. population impacts are shown in Table 2.2-4.

2.2.8 Traffic Generation

Based on the employment and population projections, the Proposed Action would generate about 95,900 average daily trips to and from the base property by the year 2013.

2.2.9 Utilities

By 2013, the projected activities and population increases in the Victor Valley would generate the following increases in utility demands over projected closure baseline conditions:

- Water - 6.1 million gallons per day (MGD), or an increase of approximately 8 percent
- Wastewater - 1.8 MGD, or an increase of 8 percent
- Solid waste - 0.13 million cubic yards per year, or an increase of approximately 5 percent
- Electricity - 580 megawatt-hours (MWH) per day, or an increase of approximately 5-1/2 percent
- Natural Gas - 30,490 therms per day, or an increase of 3-1/2 percent.

Improvements to some utility systems would be required to provide adequate service to proposed new facilities. The increases in water demand created under the Proposed Action would be within the total demand currently forecast by Mojave Water Agency (the regional State Water Project agency). On-site infrastructure improvements required to supply water under this action would be the responsibility of project developers. A brief description of required utility improvements associated with the Proposed Action is provided below for each of the systems addressed within this analysis.

Water Supply. Specific alterations to the water supply system would be dependent on the developer's requirements and the purveyor's plans to change the existing on-base supply infrastructure.

Wastewater. Regional wastewater treatment is provided by the VVWRA. The system is considered to be in good condition and improvements do not appear necessary to serve new users in the short term. No pre-treatment system exists for industrial wastewater on base. Future industrial users would most likely need to develop a pre-treatment facility.

Solid Waste. Refuse disposal services are now provided by a contractor who disposes of the solid waste at the Victorville landfill. No major changes associated with this service are anticipated under the Proposed Action.

Electricity. Electricity is provided to the base by Southern California Edison (SCE) through two power transformers connected in parallel at the base service

substation. Some modifications would be required to serve the needs of new users, minimally consisting of the installation of additional meters.

Natural Gas. Southwest Gas Company (SW Gas) supplies the base with natural gas from two transmission lines. Major renovations have been made since the most recent evaluation conducted in 1985. Some modifications would be required to serve the needs of new users, minimally consisting of the installation of additional meters.

2.3 DESCRIPTION OF ALTERNATIVES

2.3.1 International Airport Alternative

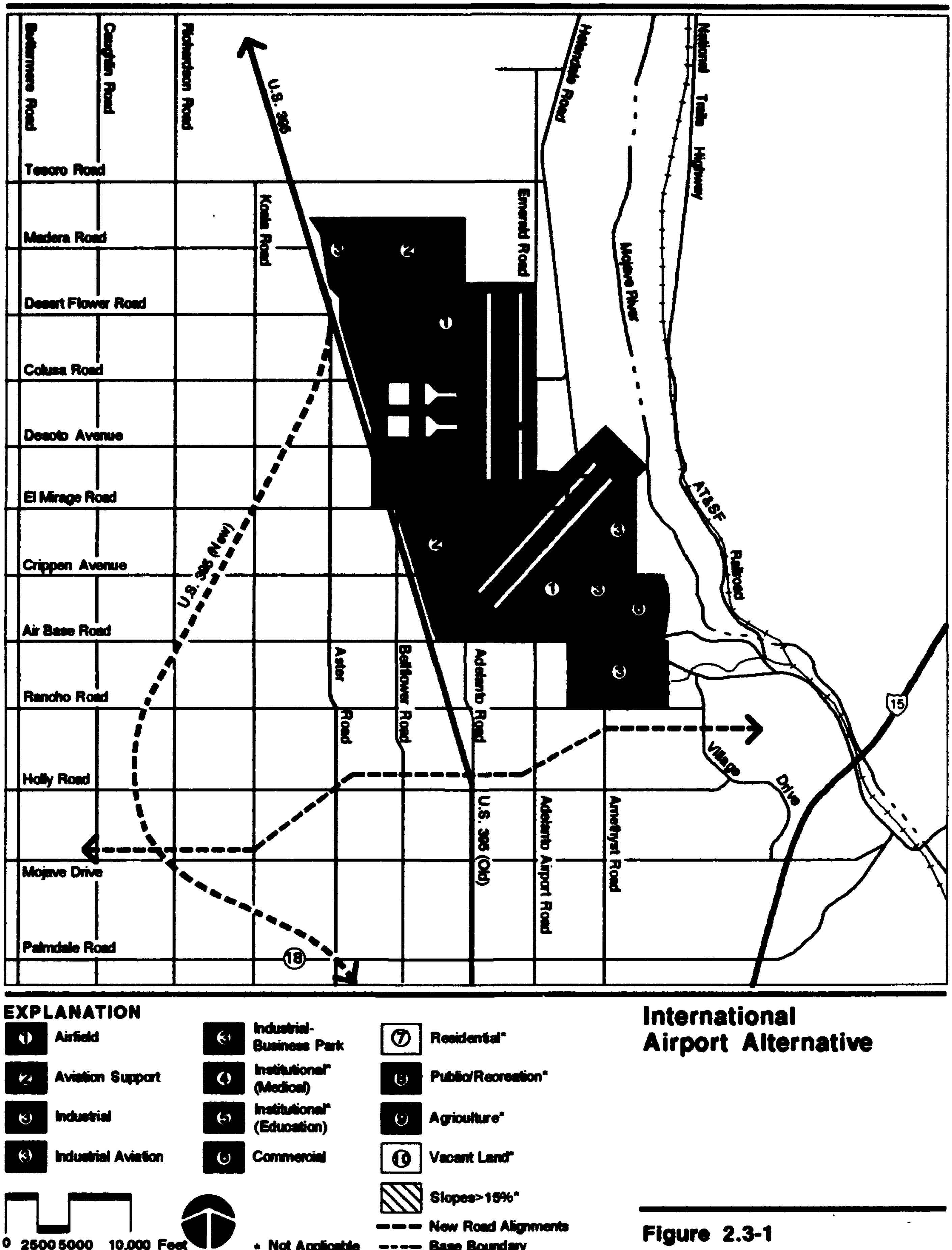
The city of Adelanto developed a reuse plan independent of that proposed by the other communities of the Victor Valley. The city proposes to acquire the base through negotiated sale and annex the base property to support the creation of the High Desert International Airport (HDIA). This facility has been designed to ultimately accommodate up to 50 MAP, as well as provide extensive cargo and freight operations and support the needs of future hypersonic and suborbital aircraft now in the planning phases. The analysis is based on 25 MAP, which would service the projected 20-year shortfall.

The 20-year time frame analyzed within this EIS will, based on regional aviation studies and reports according to the plan, see a shortfall of 24 MAP in the southern California airline passenger market. The demand in Orange County is portrayed as especially critical, because there is no suitable site for a new airport and the existing airports lack space to expand sufficiently.

The FAA's NPIAS identifies the need for a new general aviation airport in the Victorville area. The proposed Phase I establishment of a civilian general aviation reuse at George AFB would be consistent with the NPIAS goal for a new general aviation airport. The Phase II and III establishment of additional commercial aviation facilities will be considered by the FAA in a proposed 1992 update to the NPIAS.

The proposed Super Speed Train (SST) line from Anaheim, California, to Las Vegas, Nevada, with an alignment through Victor Valley, is seen as an added incentive to the marketability of the HDIA. Airline passengers, specifically from Orange County, will be encouraged to utilize this facility because of the availability of efficient transportation to and from the airport. Operations are tentatively scheduled to begin in the year 2000, after a 4-year construction period.

The International Airport Alternative (Figure 2.3-1) proposes a major super-hub facility designed to service southern California's projected long-term shortfall in passenger and cargo demand. The Airport Development District (ADD)



International Airport Alternative

Figure 2.3-1

includes the airfield and aviation support land use categories. Non-aviation land uses complete the development planned for the base-owned property, and include industrial, industrial-business park, and commercial areas. Analysis through the year 2013 encompasses development of 13,426 acres (of a total 20,000 acres proposed for the complex over a longer period of time). The ADD covers 2,920 acres, or 58 percent of base-owned property. Most of the land proposed for acquisition (8,088 of the 8,353 acres) is designated ADD. The non-aviation land use zones comprise 2,153 acres, or the remaining 42 percent of total base property. Off-base proposed land acquisition comprises only 265 acres for non-aviation purposes (Figure 2.3-2).

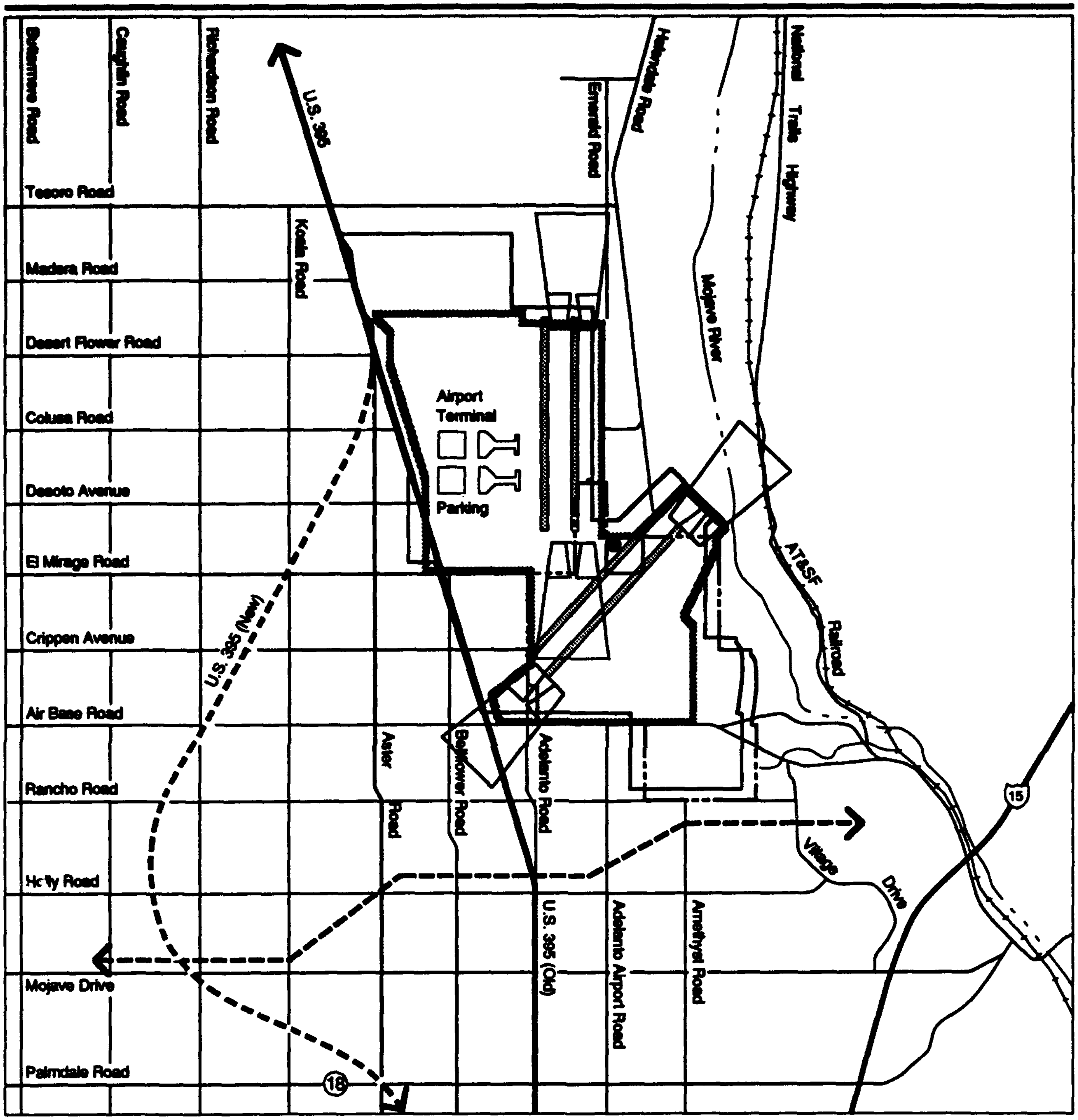
The total acreage of each land use category is shown in Table 2.3-1. Off-base property acquisition needs are discussed in the applicable land use category descriptions.

Table 2.3-1. Land Use Acreage - International Airport Alternative

	Acreage	
Land Use	Base Property	Off-Base Property Acquisition
Airfield	2,920	6,338
Aviation Support		1,750
Commercial	530	
Industrial - General	982	
Industrial - Business Park	331	
Industrial - Aviation	310	265
Subtotal	5,073	8,353
Total	13,426	

Plans for reuse and/or renovation of specific existing facilities or for demolition or new construction were not yet fully developed at the time the HDIA Plan was released by the city of Adelanto. Data for analysis were provided by the proponent, and included:

- Projected airport activity
- Projected air passenger demand
- General guidelines to phasing plans for aviation improvement
- Aviation and non-aviation related facility projections
- Proposed transportation system established in the city of Adelanto's 1990 General Plan
- General guidelines for employment and population projections
- Trip generation estimate for 2010
- Discussion of anticipated environmental impacts.



EXPLANATION

Airport Boundary

New Airfield Pavement

Runway Protection Zone

Tower

Proposed Roads

Base Boundary

0 2500 5000 10,000 Feet

Conceptual Airport Master Plan-International Airport Alternative

Figure 2.3-2

Assumptions were generated to supplement details provided in the reuse plan where necessary for purposes of analysis. These assumptions were:

- Acreage figures for proposed land uses
- Projected flight operations and fleet mixes through 2013
- Fleet mix representation of a minimum of 50 percent of applicable Stage III aircraft in 2003 and all Stage III in 2013.
- Construction/demolition activities
- Employment and population projections through 2013 for Victor Valley and the 2-county ROI
- Traffic generation and daily trip projections through 2013
- Utility requirement projections through 2013
- Areas disturbed by construction/demolition
- Phasing plans for total reuse through 2013.

2.3.1.1 Airfield. The airfield land use zone contains 9,258 acres, with only 2,920 acres, or 32 percent, located within George AFB boundaries. The airfield category encompasses the same basic components as those described for the Proposed Action.

The general layout of the HDIA is also similar to that of the Proposed Action and of the military airfield in that it retains the primary and crosswind runway configuration. However, under this alternative, one additional runway would be constructed parallel to each of the existing runways (primary and crosswind). All four would be expanded to a length of 14,000 feet and be renovated/ constructed to accommodate all types of commercial and cargo aircraft.

The airfield was designed to provide for the required peak-hour operational capacity (to support 25 MAP). It is anticipated that the majority of air traffic would flow in a north-south direction. The crosswind runways would be used only when required because of weather (e.g., crosswinds above 20 knots) except for general aviation. These conditions are expected to occur during no more than 20 percent of all commercial operations.

The primary and crosswind runways will be separated in order to provide physical access to the center of the airfield. It would be necessary to shift the existing north-south runway 1 mile to the north.

The international terminal facility would be constructed west of the primary runways. It would consist of two separate buildings with a total of 70 gate positions (the number required to service 25 MAP). A specific design for the terminal area has not been developed but an estimate of 15,000 to 25,000 square feet per gate position has been proposed for this complex.

The area that encompasses the current military flightline to the east side of the crosswind runway would be dedicated to contracted, military, fixed-base operations (FBO); corporate/executive terminal; and other general aviation uses. The existing facilities would be renovated for these uses wherever possible. General aviation operations would be focused primarily along the crosswind runways to separate them from the air carrier flight activities.

Most of the construction associated with the airfield would occur within the off-base land parcel proposed for acquisition. The new crosswind runway and any new facilities required to support general aviation functions would be built on base-owned property. The total area to be disturbed by construction would be 876 acres on site and 3,169 acres off site.

Development has been planned in phases. The existing base would serve as the temporary airport facility until 1996. The two existing runways would be used initially, and an as-yet-unidentified building would become the temporary air terminal. Construction of the new international terminal complex would begin in 1995. Activities such as general aviation and contracted military operations are assumed to begin soon after base closure. Limited commercial activities would also begin at an unspecified existing facility in 1993, and continue through 1996 when the operation can be moved to its permanent location.

The following airfield improvements are proposed and will be developed in accordance with FAA Advisory Circulars, standards, and recommendations:

- Phase I
  - Initial development of the International Airport is essentially the same as that depicted for the Proposed Action
  - Land acquisition to accommodate the ultimate airport development (Phases II and III).
- Phases II and III
  - Construction of two runways, each 14,000 feet by 200 feet (Runways 17R/35L and 17L/35R) with HIRL
  - Reconstruct, strengthen, and lengthen existing Runway 3/21 to 14,000 feet and widen to 200 feet with HIRL
  - Construct a new runway parallel to Runway 3/21 and install HIRL
  - Maintain and strengthen existing taxiway and apron systems
  - Construct new lighted taxiway system for the new runways and aprons
  - Install PAPI systems for Runways 17R, 35L, 17L, 35R, and on both ends of new Runway 3/21
  - Install REIL on Runways 35L, 35R, and on both ends of new Runway 3/21
  - Establish full precision ILSs including RVR with necessary off-airport marker facilities for Runway 17R and 17L. The ILS would consist of

a localizer and glide slope and an approach light system with sequenced flashing lights

- Abandon existing Runway 17/35
- Establish a new ATCT
- Construct a new commercial passenger terminal facility with aprons, auto parking, and road access system
- Provide facilities to accommodate rail service at the new airport area.

The off-airport compass locator outer marker, as described for the Proposed Action, would be constructed. An environmental survey would be conducted as part of the siting process to avoid potential environmental impacts resulting from construction of the marker.

The HDIA would, by the time of buildout, be able to accommodate all widebody aircraft, as well as hypersonic and suborbital aircraft. Table 2.3-2 lists the projected flight operations and fleet mix assumed for the International Airport Alternative at 5, 10, and 20 years after closure. Because of the proposed elimination of Stage II aircraft, the fleet mix for 2003 represents a minimum of 50 percent applicable Stage III aircraft. The fleet mix for 2013 consists of all Stage III aircraft.

The north-south runways would continue to be the primary runways used for commercial operations. It is assumed that 80 percent of all commercial flights would utilize these runways. The northeast-southwest trending crosswind runways would be used for the remaining 20 percent of commercial (because of weather restrictions) and all general-aviation activities.

Approximately 95 percent of all operations are likely to occur between 7:00 a.m. and 10:00 p.m. The remaining 5 percent would occur between 10:00 p.m. and 7:00 a.m.

The city of Adelanto has applied for Public Benefits Transfer of all of the aviation-related portions of George AFB. The remainder of the base is to be obtained through negotiated purchase.

2.3.1.2 Aviation Support. The aviation support land use would consist of a total of 1,750 acres, all of which are located off base. The 764-acre parcel to the southwest of the ADD, along the western border of the base, is planned for airport administration, maintenance facility offices, and equipment storage. The 986-acre parcel north of the primary runways and the terminal complex would become a major air cargo support area. The total area to be disturbed by construction would be 1,226 acres off site.

2.3.1.3 Commercial. The commercial land use zone would consist of a single 530-acre parcel at the eastern edge of the base, north of and adjacent to Air

Table 2.3-2. Projected Flight Operations - International Airport Alternative

Year	Operation	Fleet Mix		Annual Operations
1998	Air Passenger	31%	SAAB340; DHC-6	80,000
		45%	DC-9-30, B-737-300*, BAE-146	
		14%	MD-80*	
		10%	B-757-200*	
	Air Cargo	50%	DC-9-30	
		50%	B-727	2,000
	General Aviation	66%	Single Engine	12,800
		19%	Multi Engine	3,700
		8%	Turbo Prop/Jet	1,500
		7%	Helicopter	1,400
	Aircraft Maintenance	45%	B-737-300*	2,000
		5%	B-747-200	
		45%	B-757-200	
		5%	B-767-200*	
				Total 103,400
2003	Air Passenger	31%	SAAB340; DHC-6	200,000
		45%	DC-9-30, B-737-30*, BAE-146	
		14%	MD-80*	
		10%	B-757-200*	
	Air Cargo	100%	B-757-200	3,000
	General Aviation	63%	Single Engine	36,800
		20%	Multi Engine	11,700
		9%	Turbo Prop/Jet	5,200
		8%	Helicopter	4,700
	Aircraft Maintenance	45%	B-737-300*	3,000
		5%	B-747-200	
		45%	B-757-200	
		5%	B-767-200*	
				Total 264,400
2013	Air Passenger	20%	B-747-200*	525,000
		16%	MD-80*; B-737-300*	
		15%	MD-83*	
		25%	B-757-200*	
		24%	B-767-200*; DC-10-30*; L-1011-500*	
	Air Cargo	100%	B-757-200*	4,000
	General Aviation	61%	Single Engine	83,800
		21%	Multi Engine	28,800
		10%	Turbo Prop/Jet	13,700
		8%	Helicc[illegible]	11,000
	Aircraft Maintenance	45%	B-737-300*	4,000
		5%	B-747-200*	
		45%	B-757-200*	
		5%	B-767-200*	
				Total 670,300

Note: * Represents Stage III Aircraft.
Sources: Air passenger operations estimates based on projected fleet mix from discussion with Don Cortwright, aviation consultant to the city of Adelanto.
Air cargo, maintenance and general aviation estimates from commercial airport forecast (P&D Technologies, 1990).

Base Road. It has been designed as a hotel/park, and would ultimately include resort/conference facilities, hotels, golf courses, recreational facilities, and open space areas. The Mojave River Corridor will provide the backdrop for active and passive recreational activities. The existing base golf course would be retained and expanded to 18 holes.

It is assumed that all existing structures would be removed to accommodate the proposed commercial development, although residential units may be temporarily used on a short-term or interim basis. The significant stand of mature trees located in the current residential areas on base would be retained. Construction of the hotel/park complex is anticipated to begin in early 1995. The total area to be disturbed by construction would be 477 acres on site.

2.3.1.4 Industrial. The total land area incorporated under the industrial category would consist of 1,888 acres. All but 265 acres would be located within base boundaries. Three subsets of industrial land use have been identified for purposes of analysis: aviation, general, and business park.

The aviation industrial zone consists of two parcels. The on-base portion would encompass a 310-acre parcel along the eastern boundary of George AFB. The second, 265-acre parcel would be located at the northwest corner of the ADD, adjacent to the air cargo facility complex. It would comprise the sole area of land acquisition proposed for industrial use. No specific users have been targeted for these parcels; however, a range of operations such as aircraft maintenance, overhaul, and parts manufacturing could be accommodated and could benefit from the proximity to the crosswind runways and to the air cargo operations. The total area to be disturbed by construction would be 217 acres on site and 186 acres off site.

The industrial-business park area would surround the commercial zone on the western and part of the northern sides and consist of 331 acres of on-base property. Potential uses of this area include light industrial, offices, public facilities, and other typical business park activities. The total area to be disturbed by construction would be 249 acres on site.

The 982-acre site south of Air Base Road would be designated as Industrial Park V as part of the ongoing Adelanto Industrial Park Development Program. Development in this area is expected to begin soon after closure, and proceeds will be used to finance airport improvements. The total area to be disturbed by construction would be 687 acres on site.

2.3.1.5 Transportation. Specific designs for ground access within the International Airport complex have not yet been completed. Ground access to the HDIA would be provided through construction/renovation of a multi-modal system under this alternative. It would include an enhanced freeway system, local transit networks, and the SST network.

Development of this proposed transportation network is still in the planning phases. A conceptual realignment for U.S. 395, recently approved by the state, is discussed under Section 2.5, Other Future Actions in the Region. An east/west freeway connecting to Interstate 15 has also been proposed, but a specific location has not yet been identified (see Figure 2.3-1).

2.3.1.6 Employment and Population. The International Airport Alternative would generate both direct jobs (e.g., airport and aviation-related employees, industrial and commercial personnel, etc.) on-site and indirect jobs (e.g., retail/commercial, recreational, food services, etc.) in the ROI. Based on assumptions related to the floor-to-area ratio and employment factors projected for each land use, approximately 54,800 direct jobs and 50,500 indirect jobs would likely be generated in the ROI by 2013. Employment impacts are shown in Table 2.3-3.

Table 2.3-3. ROI Project-Related Employment and Population Effects – International Airport Alternative

	Closure	1998	2003	2013
Employment	68	61,246	67,380	105,307
Direct	50	36,180	38,793	54,843
Indirect	18	25,066	28,587	50,464
Population		36,533	41,613	64,932

Employment increases would be accompanied by population increases. The ROI population is expected to increase by approximately 64,900 persons over the post-closure estimate by the year 2013. Population impacts are shown in Table 2.3-3.

2.3.1.7 Traffic Generation. Based on the employment and population projections, the International Airport Alternative would generate about 310,000 average daily trips to and from the base property by the year 2013.

2.3.1.8 Utilities. By 2013, the projected activities and population increases in the Victor Valley associated with the International Airport Alternative would generate the following increases in utility demands over closure baseline conditions:

- Water - 12.9 MGD, or an increase of less than 17 percent
- Wastewater - 3.9 MGD, or an increase of 17 percent
- Solid waste - 0.28 million cubic yards per year, or an increase of 17 percent
- Electricity - 1,200 MWH per day, or an increase of 12 percent
- Natural Gas - 64,950 therms per day, or an increase of 7 percent.

Some utility systems would be improved to provide adequate service to proposed new facilities. Anticipated system improvements are expected to be similar in nature to those associated with the Proposed Action.

2.3.2 Commercial Airport with Residential Alternative

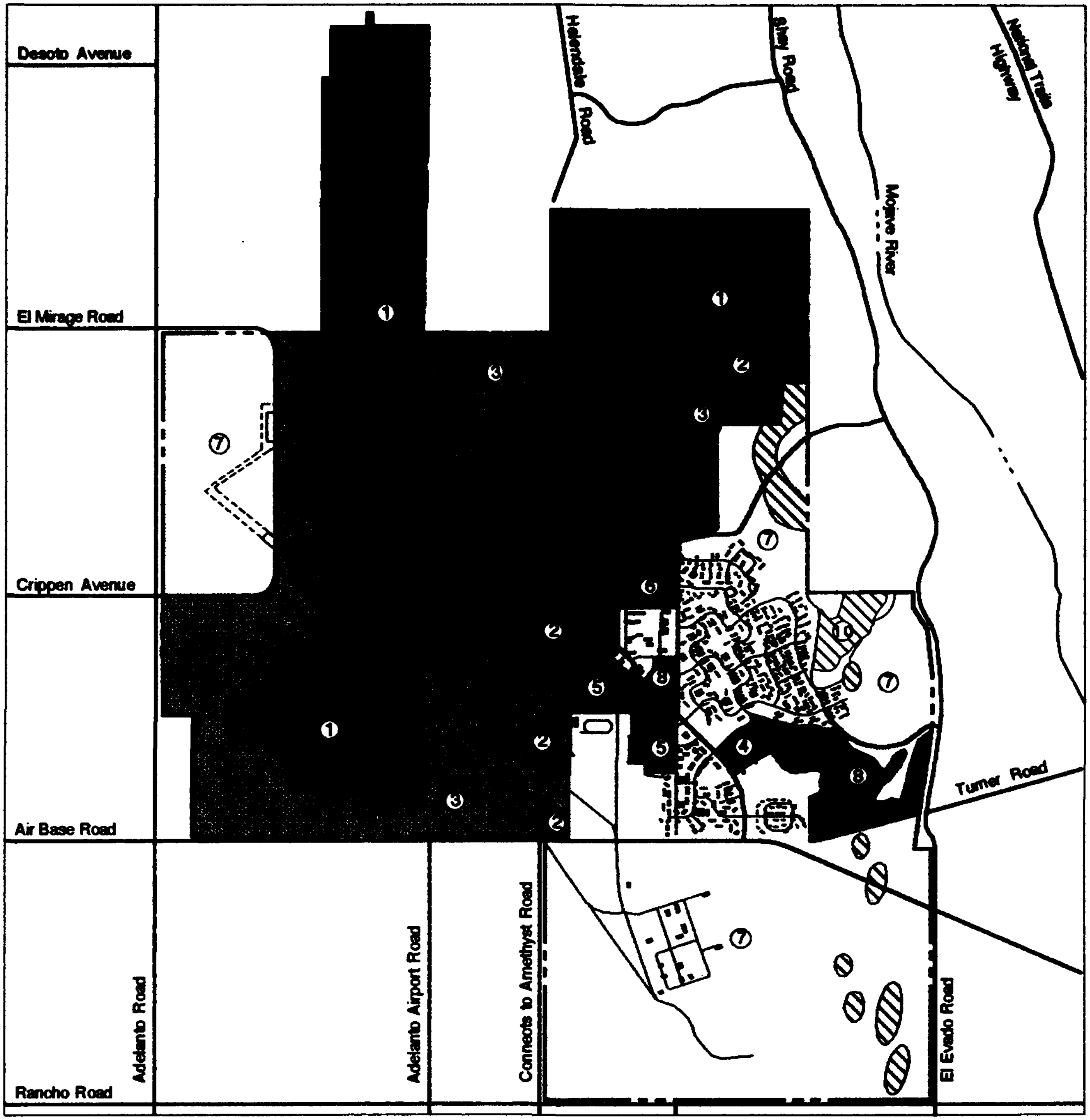
The Commercial Airport with Residential Alternative (Figure 2.3-3), is similar to the Proposed Action in that the reuse of George AFB would center around a regional airport. The airport area would encompass the airfield and aviation-support land use categories, covering 1,686 acres, or 33 percent of base-owned property. A large residential area encompassing 39 percent of the base-owned property is the main difference between this alternative and the Proposed Action.

Non-aviation land uses included within this reuse plan are commercial, industrial, recreational/vacant land, institutional, and residential. The development proposed for these 3,387 acres completes the reuse plan for the entire base. No off-base property is proposed for acquisition under this alternative.

The total acreage of each land use category is shown in Table 2.3-4.

The following assumptions were used to develop this alternative and expand upon the analysis:

- VVEDA data used in the analysis
  - proposed reuse for the existing airfield
  - conceptual plan for civilian use of the aviation facilities
  - some anticipated construction/demolition
  - general listing of anticipated airport tenants
  - general guidelines for projected employment
- Acreage figures for proposed land uses
- Projected flight operations and fleet mixes through 2013
- Fleet mix represents a minimum of 50 percent of applicable Stage III aircraft in 2003 and all Stage III aircraft in 2013.
- Employment and population projections through 2013 for the Victor Valley and 2-county ROI
- Traffic generation and daily trip projections through 2013
- Utility requirement projections through 2013
- Areas disturbed by construction/demolition
- Phasing plans for total reuse through 2013
- Residential development concepts
- Industrial and commercial development concepts
- Proposed transportation systems.



EXPLANATION

1 Airfield	5 Institutional (Education)	9 Agriculture*
2 Aviation Support	6 Commercial	10 Vacant Land
3 Industrial	7 Residential	Slopes>15%
4 Institutional (Medical)	8 Public/Recreation	Base Boundary
		Abandoned Runway
		* Not Applicable

0 750 1500 3000 Feet

Commercial Airport with Residential Alternative

Figure 2.3-3

Table 2.3-4. Land Use Acreage – Commercial Airport with Residential Alternative

Land Use	Acreage
Base Property	
Airfield	1,400
Aviation Support	286
Commercial Retail	26
Industrial	1,048
Institutional	
Higher Education	37
Medical	20
Public Education	20
Recreation/Vacant Land	261
Residential	
Existing Development	337
Proposed Development	1,638
Total	5,073

2.3.2.1 Airfield. The airfield land use zone covers 1,400 acres. The airfield includes runways, taxiways, and runway protection zones. As in the Proposed Action, the airfield would be used primarily by passenger aircraft (air carrier and commuter) and general aviation aircraft. Additional activities requiring airfield support include the transport of air cargo and flights associated with the maintenance of all types of aircraft.

Conceptual plans and specific features of the airfield are similar to those of the Proposed Action, which are cited in the Airport Master Plan (see Section 2.2.1). The major differences between the Commercial Airport with Residential Alternative and the Proposed Action are as follows:

- The overall airfield land use zone is smaller (by 27 percent, or 513 acres)
- The runway protection zones are restricted to the present base property
- All development is within existing base boundaries.

Existing facilities would be reused to the maximum extent possible, especially for aviation-related functions. However, some buildings would have to be removed or modified. The majority of rehabilitation and construction within the airfield is expected to take place soon after base closure. No land is expected to be disturbed by construction since the existing airfield would be used. Projected operations for this alternative are identical to those of the Proposed Action for the baseline year following closure (1993) and for the periods 5, 10, and 20 years beyond baseline (1998, 2003, and 2013, respectively). (See

Table 2.2-3 [Section 2.2.1] for the Commercial Airport with Residential Alternative operations.)

Passenger service, freight transportation, and general aviation activities are the same as those discussed in Section 2.2.1 for the Proposed Action.

2.3.2.2 Aviation Support. The aviation support land use zone covers 286 acres. These have been designated as areas for support of general aviation, terminal, control tower, fire station, terminal parking, and government agency usage. Existing fuel storage facilities could be used for civilian purposes.

Some existing facilities would have to be demolished and/or renovated in order to accommodate civilian aviation support-related uses. Demolition and renovation of some facilities would take place soon after base closure and should be completed within 15 years. The total area to be disturbed by construction would be 203 acres.

In addition to the airfield, some or all of the aviation support land use zones would probably fall under the jurisdiction of the airport authority. The development and operations of the aviation support area would be managed in accordance with FAA and other applicable statutes.

2.3.2.3 Commercial. The commercial land use zone covers 26 acres. The area would serve both industrial and residential development as a retail area. Existing facilities include a commissary, exchange store, and bowling center. These and other buildings could be renovated to accommodate civilian retail uses. Renovation and/or new construction is anticipated to take place within approximately 10 years. The total area to be disturbed by construction would be 23 acres.

2.3.2.4 Industrial. The industrial land use zone covers 1,048 acres. This category could include aviation-related businesses, such as aircraft maintenance, modification, and manufacturing. The industrial areas could also include general office space, research and development endeavors, and related activities. The location of aviation-related industries would minimize conflict with aircraft or vehicle movement. Existing hangars and repair shops could be used with little or no modification. Construction/renovation is not expected to occur within the first 5 years. The total area to be disturbed by construction would be 734 acres.

2.3.2.5 Institutional. The institutional land use zone covers 77 acres. Two elementary schools are presently located within this area. A 37-acre parcel could be used for some form of higher education, such as a small college, vocational, or training facility. The existing 25-bed base hospital also lies within the institutional land use area. The total area to be disturbed by construction would be 35 acres.

2.3.2.6 Recreation/Vacant Land. The recreation/vacant land use zone covers 261 acres. This area includes an existing golf course and gymnasium. Steep slopes would provide approximately 130 acres of natural open areas.

2.3.2.7 Residential. The residential land use zone covers 1,975 acres. Existing units comprise 337 acres of this total. Proposed new residential development would occur on the undeveloped base land south of Air Base Road, on the west side of the base along Adelanto Road, and north of the existing residential area. The total area to be disturbed by construction would be 1,573 acres.

2.3.2.8 Transportation. Ground access has been established in the plan throughout the aviation support and industrial land use areas adjacent to the airfield. In addition to the existing main gate and residential gate entrances, an access road west of the main gate is also proposed which would serve the industrial area west of the primary runway. All three access roads would intercept Air Base Road. A perimeter road would encircle the airport development area. The relocation of the existing road would allow access to the northeast portion of the airport. The dedicated airport access road would enable industrial users to avoid using the potentially congested Adelanto Road.

2.3.2.9 Employment and Population. The Commercial Airport with Residential Alternative would generate approximately 13,000 new direct jobs on site by the year 2013. An estimated 15,200 indirect jobs (e.g., retail/commercial, recreational, food services, etc.) are likely to be generated in the ROI. Employment impacts are shown in Table 2.3-5.

Table 2.3-5. ROI Project-Related Employment and Population Effects – Commercial Airport with Residential Alternative

	Closure	1998	2003	2013
Employment	68	10,518	18,425	28,225
Direct	50	5,175	8,703	13,002
Indirect	18	5,343	9,722	15,223
Population		5,825	10,133	16,490

Projected employment would generate population changes in the area. Population increases of approximately 16,500 over post-closure are estimated by the year 2013, including 700 students using the higher education facility. Population impacts are shown in Table 2.3-5.

2.3.2.10 Traffic Generation. Based on the employment and population projections, this alternative would generate approximately 146,600 average daily trips to and from the base property by the year 2013.

2.3.2.11 Utilities. By 2013, the projected activities and population increases in the Victor Valley associated with the Commercial Airport with Residential Alternative would generate the following increases in utility demands over closure baseline conditions:

- Water - 3.2 MGD, or an increase of 4 percent
- Wastewater - 1 MGD, or an increase of 4 percent
- Solid waste - 0.07 million cubic yards per year, or an increase of 4 percent
- Electricity - 300 MWH per day, or an increase of 3 percent
- Natural Gas - 16,100 therms per day, or an increase of less than 2 percent.

Some utility systems would have to be improved to provide adequate service to proposed new facilities. Necessary system improvements are anticipated to be the same as those associated with the Proposed Action.

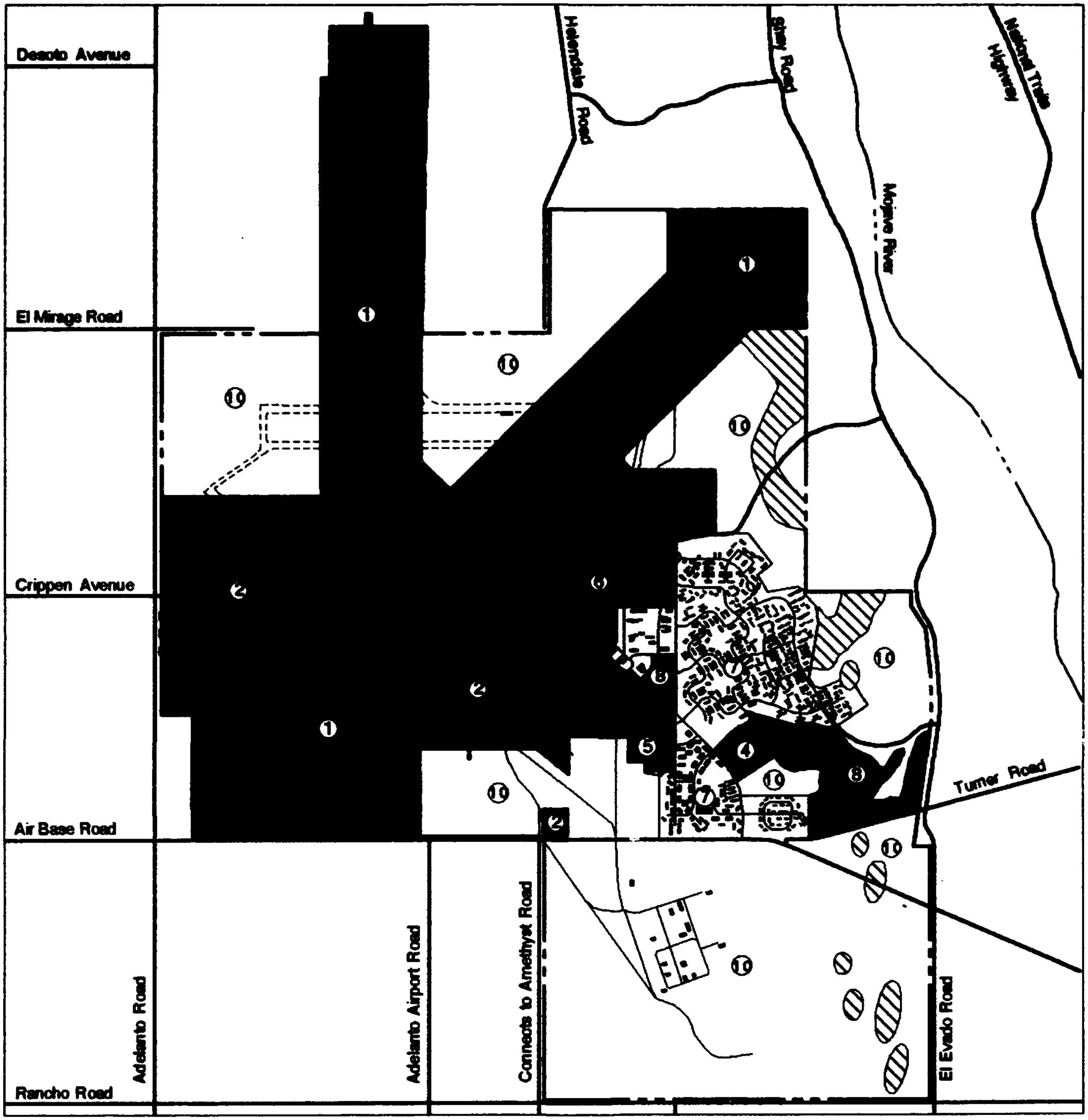
2.3.3 General Aviation Center Alternative

The General Aviation Center Alternative (Figure 2.3-4) focuses upon a variety of private aviation activities. A minimal amount of new construction is proposed; nearly all operations would reuse existing facilities. However, approximately 50 percent of the base has not been identified for development and, thus, is considered to remain inactive.

The airfield and aviation support areas comprise 2,038 acres, or 40 percent of the base property. Non-aviation land use is highlighted by a large (340 acres) residential area that would reuse the majority of the base housing units. The remaining portion of George AFB proposed for reuse has been designated for institutional, commercial, and public/recreation purposes. The total acreage of each land use category is shown in Table 2.3-6.

The General Aviation Center proponent provided the following types of data for analysis:

- An overall operations concept including air shows, museum, restaurants, housing, and concessions
- Some anticipated construction/demolition activities
- General guidelines to employment and population projections
- A general listing of anticipated airport tenants.



EXPLANATION

- ① Airfield
- ② Aviation Support
- ③ Industrial*
- ④ Institutional (Medical)
- ⑤ Institutional (Education)
- ⑥ Commercial
- ⑦ Residential
- ⑧ Public/Recreation
- ⑨ Agriculture*
- ⑩ Vacant Land
- Slopes>15%
- ---- Base Boundary
- ==== Abandoned Runway
- * Not Applicable

0 750 1500 3000 Feet

General Aviation Center Alternative

Figure 2.3-4

Table 2.3-6. Land Use Acreage - General Aviation Center Alternative

Land Use	Acreage
Base Property	
Airfield	1,573
Aviation Support	465
Commercial Retail	282
Institutional	
Education	35
Medical	20
Recreation/Vacant Land	125
	2,233
Residential	340
Total	5,073

The following assumptions were used to expand upon the analysis:

- Acreage figures for proposed land uses
- Projected flight operations and fleet mixes through 2013
- Employment and population projections through 2013 for the Victor Valley and the two-county ROI
- Traffic generation and daily trip projections through 2013
- Utility requirement projections through 2013
- Areas disturbed by construction/demolition
- Phasing plans for total reuse through 2013
- Proposed transportation systems
- Recommended use of existing buildings
- Areas disturbed by construction/demolition.

2.3.3.1 **Airfield.** The airfield land use zone consists of 1,573 acres and includes the existing runways, taxiways, and runway protection zones. Other specific features of the airfield (e.g., terminal, control tower, parking, etc.) are similar to those of the Proposed Action, as described in Section 2.2.1.

Conceptual plans and specific features of the airfield have not been developed; therefore, no airport layout plan is included for this alternative.

Nearly all facilities would be reused. The parking apron surrounding Hangar 676 would be hardened within 5 years of closure. Building 694 would be removed in order to construct a public parking lot.

Airfield activities and/or potential users identified include national air shows, corporate and private aviation, fixed base operations, and experimental and kit plane demonstrations. Projected operations for the General Aviation Center Alternative are shown for the years of analysis in Table 2.3-7. All operations would occur during daylight hours.

Table 2.3-7. Projected Flight Operations - General Aviation Center Alternative

Year	Operation	Fleet Mix	Annual Operations	
1993	General Aviation	90% Piston Engine		10,800
		10% Turbo Prop		1,200
	Aircraft Maintenance	83% Narrow Body Jet		415
		17% Wide Body Jet		85
			Total	12,500
1998	General Aviation	90% Piston Engine		24,300
		10% Turbo Prop		2,700
	Aircraft Maintenance	83% Narrow Body Jet		1,325
		17% Wide Body Jet		275
			Total	28,600
2003	General Aviation	90% Piston Engine		31,500
		10% Turbo Prop		3,500
	Aircraft Maintenance	83% Narrow Body Jet		2,150
		17% Wide Body Jet		450
			Total	37,600
2013	General Aviation	90% Piston Engine		45,000
		10% Turbo Prop		[illegible]00
	Aircraft Maintenance	83% Narrow Body Jet		3,320
		17% Wide Body Jet		680
			Total	54,000

Source: Estimates based on commercial airport forecast (P&D Technologies, 1990).

2.3.3.2 Aviation Support. The aviation support land use zone covers 465 acres. It includes facilities for aircraft maintenance, aircraft parking, aviation sales center, and other leased properties, as would be defined by market demand.

Some new construction would be undertaken for aviation support. An area of approximately 55 acres at the west end of Runway 03/21, currently used for weapon storage, would be leveled and paved to support storage of aircraft awaiting refurbishment. A building would be constructed at this site for airframe

cleaning and painting. T-hangars would be built in the area of the northwest base boundary (near the intersection of El Mirage and Adelanto roads). The total area to be disturbed by construction would be 220 acres.

Activities presently identified to be conducted within the aviation support zone include airframe manufacture, beginning immediately after closure; aircraft (commuter) overhauls, commencing in 1998; and large airframe overhaul, starting in 1996.

2.3.3.3 Commercial. A commercial area of 282 acres would occupy a large part of the cantonment area of the base. Specific uses identified for the development/reuse of facilities within this parcel would include:

- Conversion of Building 591 into an aircraft museum
- Conversion of an as-yet-unidentified warehouse for a sound stage and videotape processing studio
- Establishment of a data processing center
- Conversion of clubs and open mess to restaurants
- Reuse of the service station and commissary for the same purposes (leased to independent contractors)
- Reuse of the movie theater, library, craft center, and child care center for the same purposes (operated by the General Aviation Center)
- Establishment of a flight shop in one of the facilities to sell souvenirs of the aviation center.

2.3.3.4 Institutional. Two institutional land use zones are identified for the General Aviation Center. The institutional-medical parcel (20 acres) contains the existing base hospital, which would be leased to a private medical group. The second institutional parcel (35 acres) would retain its current educational use.

2.3.3.5 Recreation/Vacant Land. The recreation land use area comprises a total of 125 acres. Recreational areas and facilities such as parks, the golf course, athletic fields, the gymnasium, and swimming pools would be made available to the general public. These facilities would be jointly administered by the General Aviation Center and a local jurisdiction. Vacant lands constitute 2,233 acres for the General Aviation Center Alternative. Vacant land would be used as motion picture and/or television sets as the need arises.

2.3.3.6 Residential. The residential land use zone covers 340 acres. A minimum of 1,000 of the 1,641 existing units would be retained for rentals. The dormitories would be converted to apartments or townhouses. Some of the quadruplexes in base housing would be converted to duplexes.

2.3.3.7 Transportation. All access roads in and out of the base would be expanded to four lanes to facilitate traffic flow, especially during air shows. Internal roads would become one-way streets.

2.3.3.8 Employment and Population. The General Aviation Center Alternative would generate approximately 8,000 new direct jobs by the year 2013. Approximately 7,700 indirect jobs (e.g., retail/commercial, recreational, food services, etc.) would be created in the ROI. Employment impacts are shown in Table 2.3-8.

Table 2.3-8. ROI Project-Related Employment and Population Effects – General Aviation Center Alternative

	Closure	1998	2003	2013
Employment	68	11,986	15,846	15,781
Direct	50	6,131	8,074	8,046
Indirect	18	5,855	7,772	7,735
Population		6,563	9,018	9,780

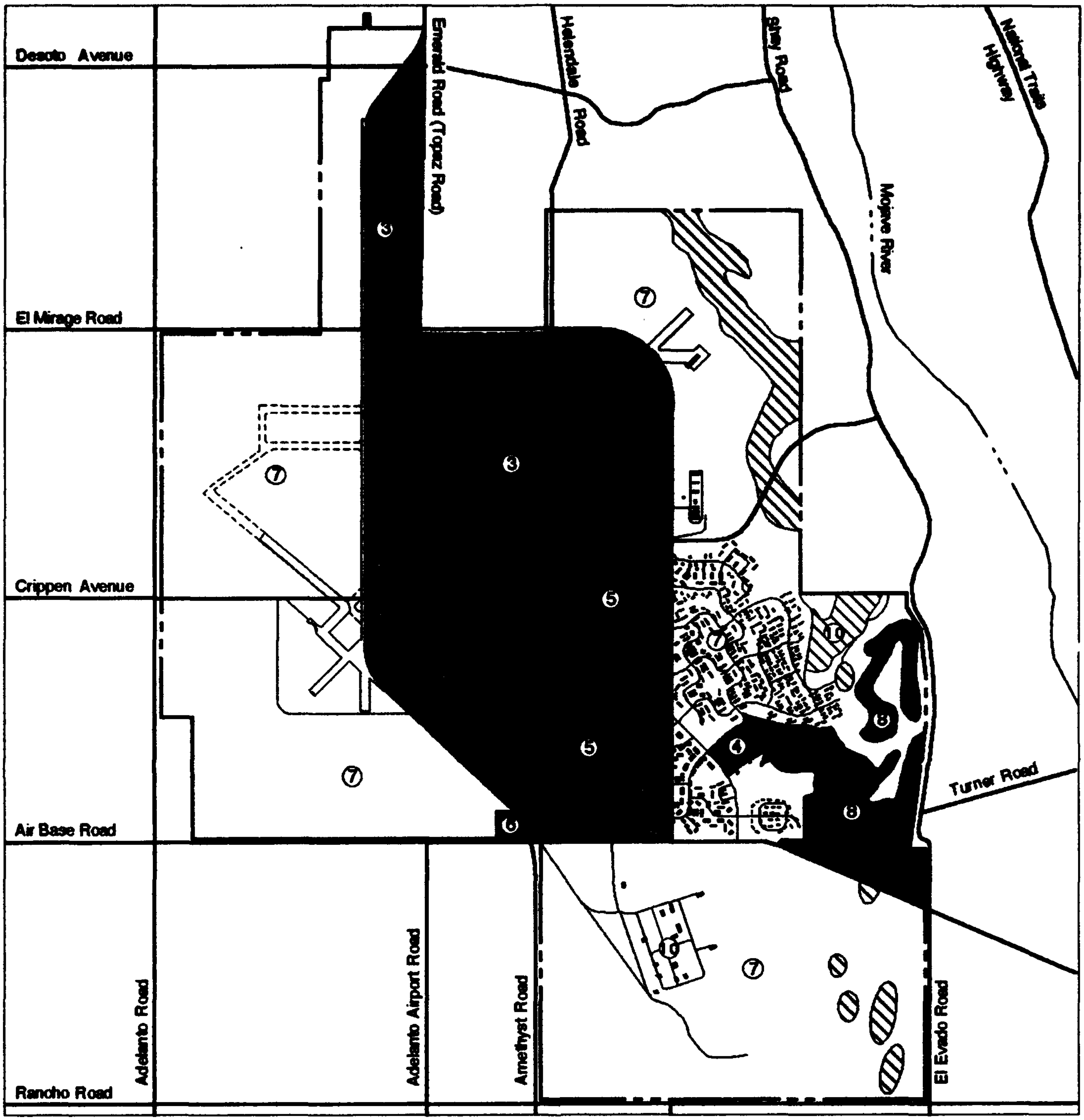
Projected employment would generate population changes in the area. An increase of approximately 9,800 persons over post-closure conditions is estimated by the year 2013. Population impacts are shown in Table 2.3-8.

2.3.3.9 Traffic Generation. The General Aviation Center Alternative would generate an estimated 96,000 average daily trips to and from the base (5 percent heavy duty diesel, 8 percent medium duty gas, and 87 percent light duty gas). An estimated 85 percent of all traffic would be on the roadways during daylight hours.

2.3.3.10 Utilities. By 2013, the projected activities and population increases in the Victor Valley associated with the General Aviation Center Alternative would generate the following increases in utility demands over closure baseline conditions:

- Water - Increase of 2.2 MGD or an increase of 3 percent
- Wastewater - Increase of 0.7 MGD or an increase of 3 percent
- Solid Waste - Increase of 0.05 million cubic yards per year or an increase of 3 percent
- Electricity - Increase of 211 MWH per day or an increase of 2 percent
- Natural Gas - Increase of 11,110 therms per day or an increase of 1 percent.

Some utility systems would have to be improved to provide adequate service to proposed new facilities. Necessary system improvements are anticipated to be the same as those associated with the Proposed Action.



EXPLANATION

1 Airfield*

2 Aviation Support*

3 Industrial

4 Institutional (Medical)

5 Institutional (Education)

6 Commercial

7 Residential

8 Public/Recreation

9 Agriculture*

10 Vacant Land

Slopes>15%

Base Boundary

Abandoned Runway

* Not Applicable

0 750 1500 3000 Feet

Non-Aviation Alternative

Figure 2.3-5

2.3.4 Non-Aviation Alternative

This alternative includes only non-aviation land uses (Figure 2.3-5). The focal point of the Non-Aviation Alternative is a large residential land use zone. The existing airfield would remain inactive and the open areas around the airfield and in the southern portion of the base would be used mainly for residential and recreational purposes. No off-base property would be acquired for this alternative. Other components of this alternative include industrial, education, medical, and commercial areas. The total acreage of each land use category is shown in Table 2.3-9.

Table 2.3-9. Land Use Acreage - Non-Aviation Alternative

Land Use	Acreage
Base Property	
Commercial Retail	20
Industrial Business Park	942
Institutional	
Higher Education	470
Medical	20
Public Education	20
Recreation/Vacant Land	290
Existing Golf Course	77
Residential	
Existing Development	337
Proposed Development	2,897
Total	5,073

The following assumptions were used to develop this alternative and expand upon the analysis:

- Conceptual plan for non-aviation use of George AFB
- Acreage figures for proposed land uses
- Construction/demolition activities
- Employment and population projections through 2013 for the Victor Valley and the 2-county ROI
- Traffic generation and daily trip projections through 2013
- Utility requirement projections through 2013
- Areas disturbed by construction/demolition
- Phasing plans for total reuse through 2013
- Proposed transportation systems
- Recommended use of existing buildings.

2.3.4.1 Commercial. The proposed commercial land use zone covers 20 acres. This retail area would serve both industrial and residential development. The existing facilities include entrance gates and the traffic check house. It is anticipated that new construction would take place in the commercial zone within 10 years of base closure. The total area to be disturbed by construction would be 18 acres.

2.3.4.2 Industrial. The industrial land use zone covers 942 acres, the majority of which are presently runways, taxiways, and the operational apron. Because demolition of these surfaces could be very expensive, they may be reused for surface storage areas or parking, as well as for new development sites. Approximately 80 percent of the industrial area includes existing industrial-type facilities. The remaining 20 percent is vacant and would be available for new development. Development of the industrial area would be phased over 20 years after base closure. The total area to be disturbed by construction would be 660 acres.

2.3.4.3 Institutional (Education/Medical). The higher education land use zone covers 470 acres. The existing facilities include stores, administrative/office space, fast-food service, child care center, dormitories, and a lounge/day room. These facilities could potentially support a small 4-year college. Demolition or renovation of some existing facilities would likely be required to support the education land uses. These activities would likely be phased to meet user demands by the year 2013. Auxiliary parking may be needed to support the demands of the employees and students. The total area to be disturbed by construction would be 295 acres.

The two elementary schools presently on base are located within the 20-acre public education portion of the institutional land use zone. The existing base hospital lies on a 20-acre parcel that comprises the institutional-medical land use area.

2.3.4.4 Recreation/Vacant Land. The recreation/vacant land use zone covers 367 acres. The existing facilities include a 9-hole golf course with clubhouse and baseball fields. The golf course would be expanded to 18 holes with housing incorporated along the fairways. Steep slopes would provide approximately 180 acres of natural open area. The recreation/vacant lands areas may be fully operational within 20 years of base closure. The total area to be disturbed by construction would be 19 acres.

2.3.4.5 Residential. The proposed residential land use zone covers 3,234 acres. Existing units comprise 337 acres of this total. Proposed units include a gated retirement community, which would occupy this area of existing units and an additional 744 acres of undeveloped land. The remaining 2,150 acres of undeveloped base land south of Air Base Road and on the west side of the base along Adelanto Road is also proposed for new residential

development. The residential development would be phased over a 20-year period. Approximately 246 units would be developed by 1998, 244 units by 2003, and 300 units by 2013, for an approximate total of 790 housing units. The total area to be disturbed by construction would be 2,770 acres.

2.3.4.6 Transportation. Circulation improvements would include a new road extending from Emerald (Topaz) Road at the north end of the base, south to Amethyst Road which would ultimately connect to the proposed east-west state highway. This north-south road would be the primary entrance to the industrial development. An improved access from Crippen Avenue in Adelanto would also be developed. Shay Road and Rancho Road would be extended. Ground access has been established in the plan throughout the residential and institutional land use areas. Two new intersections with Air Base Road would also be required.

2.3.4.7 Employment and Population. The Non-Aviation Alternative would generate approximately 8,600 new direct jobs on site and 5,200 indirect jobs in the ROI by the year 2013. Employment impacts are shown in Table 2.3-10.

Table 2.3-10. ROI Project-Related Employment and Population Effects – Non-Aviation Alternative

	Closure	1998	2003	2013
Employment	68	3,851	6,511	13,846
Direct	50	2,397	4,081	8,632
Indirect	18	1,454	2,430	5,214
Population		3,401	6,313	13,900

Projected employment would generate an estimated population increase of 13,900 over the post-closure estimate by the year 2013. In addition, about 8,400 students would enter into the region and reside in dormitories and family housing. Population impacts are shown in Table 2.3-10.

2.3.4.8 Traffic. Based on the employment and population projection, this alternative would generate approximately 185,800 average daily trips to and from the base property by the year 2013.

2.3.4.9 Utilities. By 2013, the projected activities and population increases in the Victor Valley would generate the following increases in utility demands over closure baseline conditions:

- Water - 2.8 MGD, or an increase of less than 4 percent
- Wastewater - 0.9 MGD, or an increase of less than 4 percent
- Solid Waste - 0.06 million cubic yards per year, or an increase of less than 4 percent

- Electricity - 272 MWH per day, or an increase of less than 3 percent
- Natural Gas - 14,300 therms per day, or an increase of less than 2 percent.

2.3.5 Other Land Use Concepts

This section describes land use concepts which are not part of any integrated reuse plan, but could be initiated on an individual basis. These concepts include proposed federal transfers and conveyances to non-federal agencies and private parties. Employment and population effects are shown in Table 2.3-11. Figure 2.3-6 shows the location of each of the proposed land use concepts.

U.S. Department of Justice. The BOP, through the U. S. Department of Justice, has submitted a specific request for land at George AFB. An 860-acre parcel located south of Air Base Road has been designated as a proposed Federal Correctional Complex (FCC). This parcel is the present site of the base munitions storage area. IRP sites have been identified in this area (see Section 3.3.3 for location and details). The BOP has requested that the uncontaminated portion be made available immediately following publication of the ROD. Construction would begin soon after the ROD is filed, and will not be dependent upon completion of the final cleanup phase of the contaminated area.

The BOP estimates that the proposed complex could house 2,000 to 2,750 inmates, and generate 1,000 jobs. Capital construction costs could reach $200 million, and the annual operating budget would be approximately $32 million.

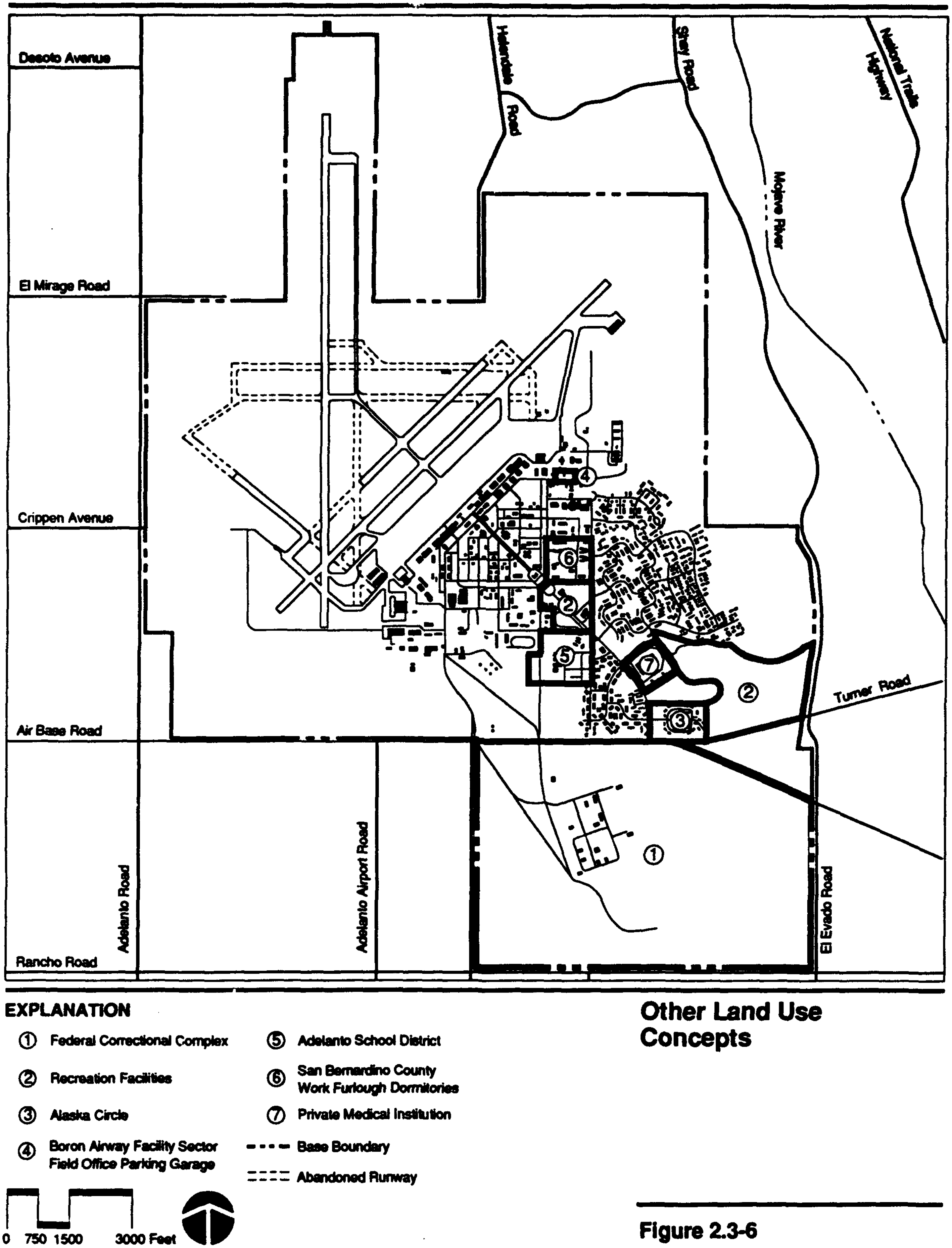
U. S. Department of the Interior. The U.S. Department of the Interior (National Park Service) has requested the transfer of base recreational facilities to a local jurisdiction through the public benefit program. Specific facilities identified include, but are not limited to, the following:

- Schmidt Park and Pool
- Ballfields
- Base gymnasium
- Base youth center
- Golf course
- Base recreation center.

Apart from administration of the aforementioned public benefit program, the National Park Service is not interested in acquiring any George AFB properties for its own use.

Table 2.3-11. Employment and Population Effects of Other Land Use Concepts

Agency/Concept	Employment/Population	Relevant Alternative	Net Effect
U.S. Department of Justice/ Prison	1,000 direct jobs; 2,375 inmates	Proposed Action	Reduced industrial development; reduction of 2,480 on-site jobs.
		International Airport	Reduced industrial development; reduction of 2,480 on-site jobs.
		Commercial Airport with Residential	Reduced residential development; net increase of 1,000 on-site jobs; residential opportunities by proximity to Federal Correctional Complex.
		General Aviation Center	Reduced open space; net increase of 1,000 on-site jobs; residential opportunities by proximity to Federal Correctional Complex.
		Non-Aviation	Same effects as for Commercial Airport with Residential Alternative.
U.S. Department of the Interior/Recreational Facilities	5 direct jobs	Proposed Action	Reduced commercial development; net reduction of 960 on-site jobs.
		International Airport	Reduced business park usage; net reduction of 205 on-site jobs.
		Non-Aviation	Reduced residential development; net increase of 5 direct jobs.
U.S. Department of Housing and Urban Development/ Alaska Circle	No direct jobs; no impact on population	Proposed Action	Reduced industrial development; net reduction of 677 on-site jobs; positive impact to homeless population in region.
		International Airport	Reduced industrial development; net reduction of 1,700 on-site jobs; positive impact to homeless population in region.
U.S. Department of Transportation/Garage	None	All	Garage space for 7 vehicles; no socioeconomic effects.
U.S. Department of Education/Schools	102 direct jobs; 1,161 students	Proposed Action	Reduced commercial development; net reduction of 578 jobs.
		International Airport	Reduced business park usage; net reduction of 45 jobs.
San Bernardino County Work Furlough Program/ Dormitories	20 direct jobs; 200 inmates	Proposed Action	Reduced commercial development; net reduction of 480 on-site jobs.
		International Airport	Reduced industrial development; net reduction of 102 on-site jobs.
		All	Existing dormitories used to house inmates in program; potential for reduced demand for residential opportunities by proximity to inmates.
Victor Valley Medical Facilities/Private Medical Institution	60 direct jobs	All	Use of existing base hospital, probably for out-patient clinic, special purpose, or medical teaching facility.
		Proposed Action	Net reduction of 327 on-site jobs.
		International Airport	Net reduction of 915 on-site jobs.



Other Land Use Concepts

Figure 2.3-6

U. S. Department of Housing and Urban Development. As part of the McKinney Act of 1987 (P. L. 100-77), HUD, in conjunction with the Department of Health and Human Services and the General Services Administration, identifies surplus government buildings and properties for suitability as housing for the homeless. Housing for low-income families and individuals and for the homeless population in the Victor Valley has been identified within the existing housing area in the southeast region of George AFB. There are 60 residential units along Alaska Circle, Hawaii Street, and Sheppard Street east of Cory Boulevard. The Alaska Circle Community, a specific proposal developed by the Lillie Ruff's Inc. Homeless Program, lies just north of Air Base Road, close to the hospital and adjacent to the golf course. It is surrounded on all sides by approximately 400 feet of vacant land.

All 60 units were constructed in 1966, and represent the most recent construction within the housing area. There are 56 three- or four-bedroom duplexes within the Alaska Circle Community. The remaining buildings consist of four-bedroom detached individual homes. The houses and their associated landscaping have been well maintained. Needed renovations would be minor, and consist primarily of interior/exterior painting, and carpet and fixture replacement. The residences could be occupied soon after base closure.

U. S. Department of Transportation. The FAA, through the U. S. Department of Transportation, has expressed interest in obtaining a garage at George AFB for use by the Boron Airway Facilities Sector Field Office (AFSFO). The base automotive hobby shop has been identified as adequate to meet the AFSFO's need for a facility to house seven government vehicles.

U. S. Department of Education. Following the completion of a preliminary screening, the U. S. Department of Education has expressed interest in certain facilities and property on George AFB on behalf of San Bernardino County and the Adelanto School District. Details of the preliminary proposals for reuse are as follows:

- Adelanto School District
  - 10-acre parcel that includes George AFB School
  - 30-acre parcel consisting of (1) a 10-acre site surrounding the Harry R. Sheppard School, (2) a 10-acre site adjacent to the southern boundary of the Sheppard School, and (3) a 10-acre site located between the eastern boundary of the Sheppard School and the southern boundary of George School
  - 10-acre parcel on Texas Street, on the northern side of the base
  - Base gymnasium and athletic fields.

- San Bernardino County Library

- An unidentified 35,000 square foot facility is requested for a regional library and bookmobile headquarters.

- San Bernardino County Museum
  - An unidentified 8,000 square foot facility has been proposed for research and operations.

- San Bernardino County Superintendent of Schools
  - Community College and school districts have expressed interest in reuse of some of George AFB property. Specific proposals have not yet been formulated.

San Bernardino County Work Furlough Program. San Bernardino County is interested in obtaining one or more of the existing facilities on George AFB to house inmates in support of their Work Furlough Program. Although specific buildings have not yet been identified, it is likely, based on a similar request in another location, that a dormitory or barracks type of facility would be selected. This program would support approximately 200 inmates and require 20 staff members.

Medical Facilities. Several private medical facilities in the Victor Valley have expressed a desire to acquire the base hospital. Reuse would most likely entail conversion to an out-patient clinic, special purpose, or medical teaching facility, *and would generate 60 jobs on site.*

2.3.6 No-Action Alternative

The No-Action Alternative would result in the U.S. Government retaining ownership of the property after closure. The property would not be put to further use. The base would be preserved, i.e., placed in a condition intended to limit deterioration and ensure public safety. A disposal management team (DMT) would be provided to ensure base security and maintain the grounds and physical assets, including the existing utilities and structures. No other military activities/missions would be performed on the property.

The future land uses and levels of maintenance would be as follows:

- Maintain structures in mothballed condition. This would involve disconnecting or draining some utility lines and securing facilities.
- Isolate or deactive utility distribution lines on base.
- Provide limited maintenance of roads to ensure access.
- Provide limited grounds maintenance of open areas. This would primarily consist of infrequent cutting to eliminate fire, health, and safety hazards.
- Maintain golf course in such a manner as to facilitate economical resumption of use.
- Maintain existing leases, where applicable.

A DMT has been established at George AFB. The responsibilities of this team include coordinating closure activities, establishing a caretaker force to maintain Air Force properties after closure, and serving as the Air Force liaison supporting community reuse. For the purposes of environmental analysis, it was assumed that this team would comprise approximately 50 people at the time of closure.

The DMT, as used in this document, may refer to the Air Force disposal personnel or to one of the caretaker contractors. In some cases each team may have distinct responsibilities. For example, under the No-Action Alternative, each contractor is responsible for the management and disposition of their own hazardous waste. The Air Force DMT would be responsible for inspection and oversight to ensure hazardous waste practices are in compliance with pertinent regulations.

The base would maintain its license with the State Water Resources Control Board to continue to fill its water requirements from the same well system although the amount drawn would be significantly reduced. Nonessential water lines would be drained and shut off. VVWRA would continue to provide wastewater treatment under caretaker status, but the flow would be negligible or zero. Solid waste collection from the base would likely be reduced to a negligible level under this alternative. The existing power and space-heating systems serving George AFB would likely be utilized at substantially reduced levels while the base is in caretaker status. Electrical power would be required for security lighting and other essential systems, and natural gas would probably be required during winter months to maintain minimal space heating in mothballed facilities.

2.4 ALTERNATIVES ELIMINATED FROM FURTHER CONSIDERATION

Several other possible alternatives were considered but eliminated by the Air Force from further study. These reuse plans were very similar to the alternatives already subject to environmental impact analysis. Therefore, the conditions presented were already covered in the range of options reflected within the Proposed Action and alternatives.

2.4.1 Evolving Airport

A potential alternative proposed by VVEDA considered reuse of George AFB as an evolving regional air carrier airport located within existing base boundaries. This plan was not chosen by VVEDA for further development and, thus, was not analyzed, because of its limited growth capacity.

2.4.2 Regional Hub Airport

VVEDA also considered a regional medium hub airport within existing base boundaries for a potential reuse option. This proposal was not developed further because of its limited scope and inability to accommodate airport expansion.

2.4.3 Expandable Airport

A local/regional airport plan was presented by the city of Adelanto as an additional alternative to their international airport plan. The airport would begin operations to serve 1 MAP, then expand to ultimately accommodate 15 MAP. This plan was dropped from further consideration and development by the city of Adelanto because it failed to allow sufficient expansion to meet Adelanto's projected goals. This alternative is generally encompassed within the Proposed Action.

2.4.4 Non-Airport Land Use

A land use plan that would ultimately eliminate all aircraft operations from George AFB was also developed by the city of Adelanto. This plan was not analyzed separately since a non-aviation plan developed for this study incorporated all of the same basic land uses. Analysis of the Non-Aviation Alternative therefore encompassed reuses proposed by the city of Adelanto.

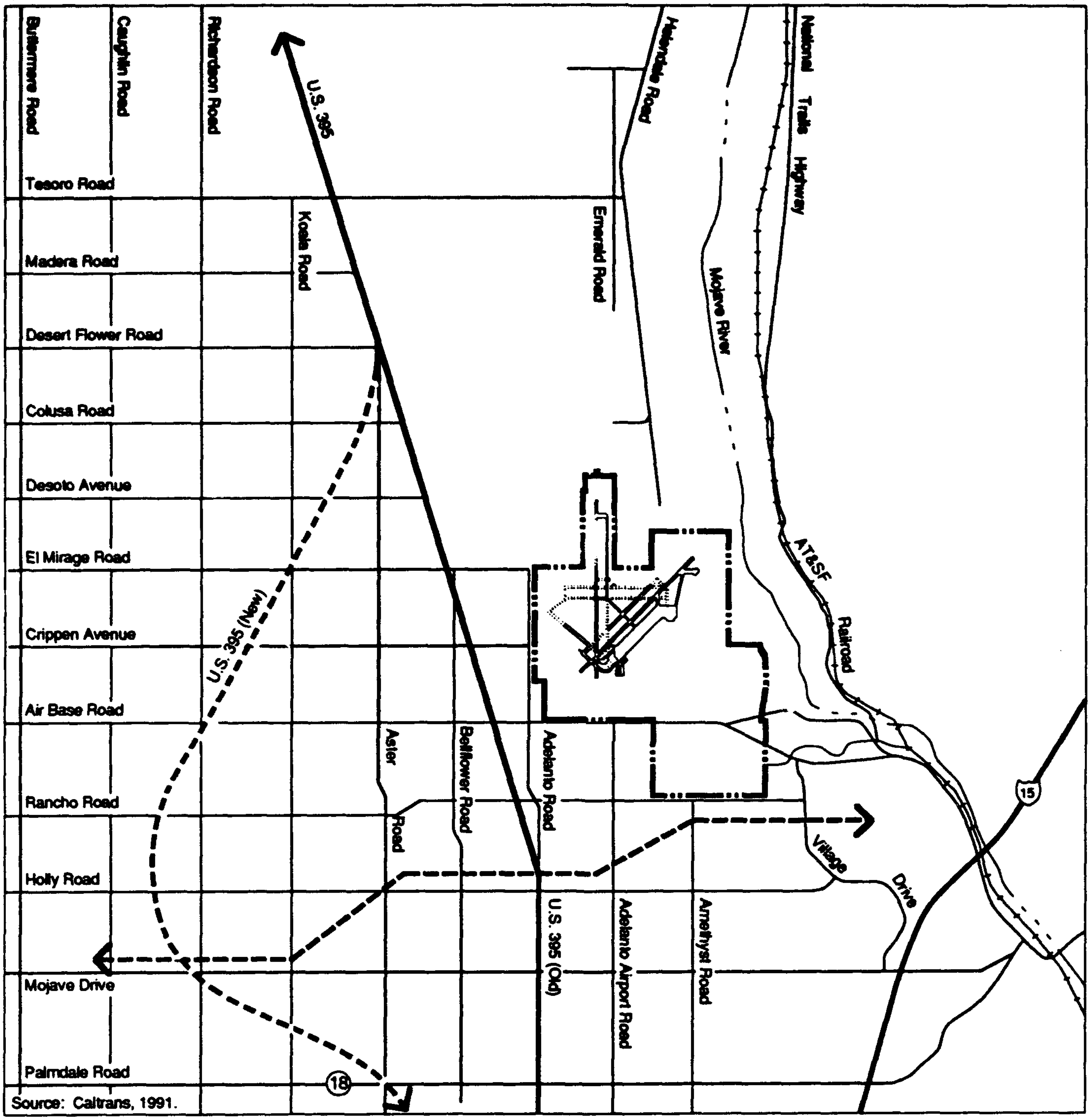
2.5 OTHER FUTURE ACTIONS IN THE REGION

Three reasonably foreseeable future actions could be considered as contributing to a potential cumulative impact on the disposal and reuse of George AFB. The first action is Air Force activity at other bases in and adjacent to San Bernardino County.

- Norton AFB - Norton AFB is scheduled to close in 1994.
- March AFB - March AFB is projected to be realigned; retiring one unit, and relocating several Norton AFB units.
- Edwards AFB - Total Air Force and civilian contractor personnel is projected to decrease by several thousand over the next few years.

These Air Force actions are expected to have a minimal impact on alternatives for reuse of George AFB.

The proposed realignment of U.S. 395 (Figure 2.5-1) would have the mitigating effect of increasing roadway capacity, thereby reducing the level of service (LOS) rating. A project start-up date has not yet been established.



EXPLANATION

New Road Alignments

Base Boundary

Abandoned Runway

0 2500 5000 10,000 Feet

Highway 395 Conceptual Realignment

Figure 2.5-1

The SST, proposed by the California-Nevada Super-Speed Ground Transportation Commission, has been delayed for the forseeable future due to financing difficulties. The possible traffic mitigation effects of the SST are addressed under the International Airport Alternative in Section 4.2.3.2.

2.6 COMPARISON OF ENVIRONMENTAL IMPACTS

A summary comparison of the influencing factors and environmental impacts on each biophysical resource affected by the Proposed Action and alternatives is presented in Tables 2.6-1 through 2.6-6. Influencing factors are non-biophysical elements, such as population, employment, land use, aesthetics, public utility systems, and transportation networks, that directly impact the environment. These activities have been analyzed to determine their effects on the environment. Impacts to the environment are described briefly in the summary and discussed in detail in Chapter 4.0. Tables 2.6-7 and 2.6-8 present influencing factors and environmental impacts of the federal transfers and independent land use concepts.

Table 2.6-1. Summary of Project-Related Influencing Factors for Reuse of George AFB in the Year 1998*
Page 1 of 2

Resource Category	Proposed Action	International Airport Alternative	Commercial Airport with Residential Alternative	General Aviation Center Alternative	Non-Aviation Alternative	No-Action Alternative
Local Community						
• Population						
Victor Valley	Increase of 8,100	Increase of 32,000	Increase of 5,000	Increase of 5,700	Increase of 3,100	No increase in long term
ROI	Increase of 9,400	Increase of 36,500	Increase of 5,800	Increase of 6,500	Increase of 3,400	No increase in long term
• Direct Employment (on-site)	Increase of 9,100	Increase of 36,100	Increase of 5,100	Increase of 6,100	Increase of 2,300	No increase in long term
• Indirect Employment						
Victor Valley	Increase of 5,000	Increase of 13,400	Increase of 2,800	Increase of 3,800	Increase of 1,000	No increase in long term
ROI	Increase of 9,200	Increase of 25,000	Increase of 5,300	Increase of 5,800	Increase of 1,400	No increase in long term
• Traffic (annual average daily trips)	Increase of 33,000	Increase of 146,100	Increase of 75,400	Increase of 79,300	Increase of 60,900	No change
• Flight Operations (annual)	Increase of 53,600	Increase of 103,400	Increase of 53,600	Increase of 28,600	No increase	No change
• Water Demand (gpd)	Increase of 1.8 million	Increase of 7.3 million	Increase of 1.1 million	Increase of 1.5 million	Increase of 0.7 million	No change
• Sewage Demand (gpd)	Increase of 0.4 million	Increase of 1.6 million	Increase of 0.3 million	Increase of 0.3 million	Increase of 0.2 million	No change
• Solid Waste Generation (cubic yards per year)	Increase of 0.04 million	Increase of 0.16 million	Increase of 0.02 million	Increase of 0.03 million	Increase of 0.02 million	No change
• Electricity Demand (MWH/day)	Increase of 170	Increase of 680	Increase of 110	Increase of 140	Increase of 70	No change
• Natural Gas Demand (therms/day)	Increase of 9,300	Increase of 36,700	Increase of 5,800	Increase of 7,500	Increase of 3,500	No change
• Land Use	Acquisition of 338 acres required. Relocation of 1 residence. Conflicts with residential development	Acquisition of 6,338 acres required. Relocation of 490 residences, 2 apartments, and 30 non-residential establishments. Conflicts with residential development	No property acquisition required. Conflict with current zoning	No property acquisition required. Potential conflict with residential-zoned areas	No property acquisition required. Conflict with current zoning	No change

* Factors reflect change in Proposed Action and all alternatives over No-Action Alternative in 1998 (e.g., employment under Proposed Action is reduced by the number of DMT employees).

Table 2.6-1. Summary of Project-Related Influencing Factors for Reuse of George AFB in the Year 1998*
Page 2 of 2

Resource Category	Proposed Action	International Airport Alternative	Commercial Airport with Residential Alternative	General Aviation Center Alternative	Non-Aviation Alternative	No-Action Alternative
• Ground Disturbance (on and off base)	502 acres (on base) 101 acres (off base)	1,164 acres (on base) 268 acres (off base)	430 acres (on base)	220 acres (on base)	975 acres (on base)	No change
Hazardous Material/Waste Management						
• Hazardous Materials	Increase in types and quantities	Increase in types and quantities	Increase in types and quantities	Increase in types and quantities	Increase in types and quantities	No change
• Hazardous Waste	Increase in types and quantities	Increase in types and quantities	Increase in types and quantities	Increase in types and quantities	Increase in types and quantities	No change
• IRP	No impact, remediation may delay redevelopment	No impact, remediation may delay redevelopment	No impact, remediation may delay redevelopment	No impact, remediation may delay redevelopment	No impact, remediation may delay redevelopment	No impact
• Storage Tanks	Reuse of some existing tanks. Removal as required	Reuse of some existing tanks. Removal as required	Reuse of some existing tanks. Removal as required	Reuse of some existing tanks. Removal as required	Reuse of some existing tanks. Removal as required	Maintenance/ removal as required
• Asbestos	Some renovation/ demolition may require management in place or removal	Some renovation/ demolition may require management in place or removal	Some renovation/ demolition may require management in place or removal	Some renovation/ demolition may require management in place or removal	Some renovation/ demolition may require management in place or removal	No change
• Pesticides and Herbicides	No impact	No impact	No impact	No impact	No impact	No change
• PCBs	No impact	No impact	No impact	No impact	No impact	No change
• Radon	No impact	No impact	No impact	No impact	No impact	No change
• Medical/Biohazardous Waste	No impact	No impact	No impact	No impact	No impact	No change

* Factors reflect change in Proposed Action and all alternatives over No-Action Alternative in 1998 (e.g., employment under Proposed Action is reduced by the number of DMT employees).

Table 2.6-2. Summary of Project-Related Influencing Factors for Reuse of George AFB in the Year 2003*
Page 1 of 2

Resource Category	Proposed Action	International Airport Alternative	Commercial Airport with Residential Alternative	General Aviation Center Alternative	Non-Aviation Alternative	No-Action Alternative
Local Community						
• Population						
Victor Valley	Increase of 16,900	Increase of 36,400	Increase of 8,700	Increase of 7,800	Increase of 5,700	No increase in long term
ROI	Increase of 19,600	Increase of 41,600	Increase of 10,100	Increase of 8,900	Increase of 6,300	No increase on long term
• Direct Employment (on site)	Increase of 17,900	Increase of 38,800	Increase of 8,700	Increase of 8,100	Increase of 4,100	No increase in long term
• Indirect Employment						
Vict - Valley	Increase of 10,000	Increase of 15,900	Increase of 15,100	Increase of 5,100	Increase of 1,700	No increase in long term
ROI	Increase of 18,100	Increase of 28,600	Increase of 9,700	Increase of 7,800	Increase of 2,400	No increase in long term
• Traffic (annual average daily trips)	Increase of 64,900	Increase of 171,600	Increase of 101,900	Increase of 95,900	Increase of 101,500	No change
• Flight Operations (annual)	Increase of 64,700	Increase of 264,400	Increase of 64,700	Increase of 37,600	No change	No change
• Water Demand (gpd)	Increase of 3.8 million	Increase of 8.3 million	Increase of 2.0 million	Increase of 2.0 million	Increase of 1.2 million	No change
• Sewage Demand (gpd)	Increase of 1.1 million	Increase of 2.3 million	Increase of 0.5 million	Increase of 0.6 million	Increase of 0.4 million	No change
• Solid Waste Generation (cubic yards per year)	Increase of 0.08 million	Increase of 0.18 million	Increase of 0.04 million	Increase of 0.04 million	Increase of 0.03 million	No change
• Electricity Demand (MWH/day)	Increase of 360	Increase of 780	Increase of 190	Increase of 190	Increase of 120	No change
• Natural Gas Demand (therms/day)	Increase of 19,300	Increase of 41,800	Increase of 9,[illegible]	Increase of 10,200	Increase of 6,500	No change
• Land Use	Acquisition of 473 acres required. Relocation of 1 residence. Conflicts with residential development	Acquisition of 7,013 acres required. Relocation of 490 residences, 2 apartments, and 30 non-residential establishments. Conflicts with residential development and current zoning	No property acquisition required. Conflict with current zoning	No property acquisition required. Potential conflict with residential-zoned areas	No property acquisition required. Conflict with current zoning	No change

* Factors reflect change in Proposed Action and all alternatives over No-Action Alternative in 2003 (e.g., employment under Proposed Action is reduced by the number of DMT employees).

Table 2.6-2. Summary of Project-Related Influencing Factors for Reuse of George AFB in the Year 2003*
Page 2 of 2

Resource Category	Proposed Action	International Airport Alternative	Commercial Airport with Residential Alternative	General Aviation Center Alternative	Non-Aviation Alternative	No-Action Alternative
• Ground Disturbances (on and off base)	1,289 acres (on-base) 101 acres (off-base)	2,381 acres (on-base) 3,705 acres (off-base)	1,315 acres (on-base)	220 acres (on-base)	2,139 acres (on-base)	No change
Hazardous Material/Waste Management						
• Hazardous Materials	Increase in types and quantities.	Increase in types and quantities.	Increase in types and quantities.	Increase in types and quantities.	Increase in types and quantities.	No change
• Hazardous Waste	Increase in types and quantities.	Increase in types and quantities.	Increase in types and quantities.	Increase in types and quantities.	Increase in types and quantities.	No change
• IRP	No impact, remediation may delay redevelopment.	No impact, remediation may delay redevelopment.	No impact, remediation may delay redevelopment.	No impact, remediation may delay redevelopment.	No impact, remediation may delay redevelopment.	No impact
• Storage Tanks	Reuse of some existing tanks. Removal as required.	Reuse of some existing tanks. Removal as required.	Reuse of some existing tanks. Removal as required.	Reuse of some existing tanks. Removal as required.	Reuse of some existing tanks. Removal as required.	Maintenance/ removal as required.
• Asbestos	Some renovation/ demolition may require management in place or removal.	Some renovation/ demolition may require management in place or removal.	Some renovation/ demolition may require management in place or removal.	Some renovation/ demolition may require management in place or removal.	Some renovation/ demolition may require management in place or removal.	No change
• Pesticides and Herbicides	No impact	No impact	No impact	No impact	No impact	No change
• PCBs	No impact	No impact	No impact	No impact	No impact	No change
• Radon	No impact	No impact	No impact	No impact	No impact	No change
• Medical/Biohazardous Waste	No impact	No impact	No impact	No impact	No impact	No change

* Factors reflect change in Proposed Action and all alternatives over No-Action Alternative in 2003 (e.g., employment under Proposed Action is reduced by the number of DMT employees).

Table 2.6-3. Summary of Project-Related Influencing Factors for Reuse of George AFB in the Year 2013*
Page 1 of 2

Resource Category	Proposed Action	International Airport Alternative	Commercial Airport with Residential Alternative	General Aviation Center Alternative	Non-Aviation Alternative	No-Action Alternative
Local Community						
• Population						
Victor Valley	Increase of 26,600	Increase of 56,700	Increase of 14,100	Increase of 8,500	Increase of 12,500	No increase in long term
ROI	Increase of 30,700	Increase of 64,900	Increase of 16,500	Increase of 9,800	Increase of 13,900	No increase in long term
• Direct Employment (on-site)	Increase of 25,300	Increase of 54,800	Increase of 13,000	Increase of 8,000	Increase of 8,600	No increase in long term
• Indirect Employment						
Victor Valley	Increase of 15,000	Increase of 31,000	Increase of 8,200	Increase of 5,100	Increase of 3,500	No increase in long term
ROI	Increase of 25,700	Increase of 50,400	Increase of 15,200	Increase of 7,700	Increase of 5,200	No increase in long term
• Traffic (annual average daily trips)	Increase of 95,700	Increase of 309,900	Increase of 146,400	Increase of 95,900	Increase of 185,600	No change
• Flight Operations (annual)	Increase of 76,000	Increase of 670,300	Increase of 76,000	Increase of 54,000	No change	No change
• Water Demand (gpd)	Increase of 6.1 million	Increase of 12.9 million	Increase of 3.2 million	Increase of 2.2 million	Increase of 2.8 million	No change
• Sewage Demand (gpd)	Increase of 1.8 million	Increase of 3.9 million	Increase of 1.0 million	Increase of 0.7 million	Increase of 0.9 million	No change
• Solid Waste Generation (cubic yards per year)	Increase of 0.13 million	Increase of 0.28 million	Increase of 0.07 million	Increase of 0.05 million	Increase of 0.06 million	No change
• Electricity Demand (MWH/day)	Increase of 580	Increase of 1,240	Increase of 310	Increase of 210	Increase of 270	No change
• Natural Gas Demand (therms/day)	Increase of 30,500	Increase of 65,000	Increase of 16,100	Increase of 11,100	Increase of 14,300	No change
• Land Use	Acquisition of 2,352 acres required. Relocation of 1 residence. Conflicts with residential development	Acquisition of 8,353 acres required. Relocation of 490 residences, 2 apartments, and 30 non-residential establishments. Conflicts with residential development and current zoning	No property acquisition required. Conflict with current zoning	No property acquisition required. Potential conflict with residential-zoned areas	No property acquisition required. Conflict with current zoning	No change

* Factors reflect change in Proposed Action and all alternatives over No-Action Alternative in 2013 (e.g., employment under Proposed Action is reduced by the number of DMT employees).

Table 2.6-3. Summary of Project-Related Influencing Factors for Reuse of George AFB in the Year 2013*

Page 2 of 2

Resource Category	Proposed Action	International Airport Alternative	Commercial Airport with Residential Alternative	General Aviation Center Alternative	Non-Aviation Alternative	No-Action Alternative
• Ground Disturbances (on and off base)	2,439 acres (on base) 202 acres (off base)	2,506 acres (on base) 4,581 acres (off base)	2,568 acres (on base)	220 acres (on base)	3,762 acres (on base)	No change
Hazardous Material/Waste Management						
• Hazardous Materials	Increase in types and quantities	Increase in types and quantities	Increase in types and quantities	Increase in types and quantities	Increase in types and quantities	No change
• Hazardous Waste	Increase in types and quantities	Increase in types and quantities	Increase in types and quantities	Increase in types and quantities	Increase in types and quantities	No change
• IRP	No impact, remediation may delay redevelopment	No impact, remediation may delay redevelopment	No impact, remediation may delay redevelopment	No impact, remediation may delay redevelopment	No impact, remediation may delay redevelopment	No impact
• Storage Tanks	Reuse of some existing tanks. Removal as required	Reuse of some existing tanks. Removal as required	Reuse of some existing tanks. Removal as required	Reuse of some existing tanks. Removal as required	Reuse of some existing tanks. Removal as required	Maintenance/ removal as required
• Asbestos	Some renovation/ demolition may require management in place or removals	Some renovation/ demolition may require management in place or removals	Some renovation/ demolition may require management in place or removals	Some renovation/ demolition may require management in place or removals	Some renovation/ demolition may require management in place or removals	No change
• Pesticides and Herbicides	No impact	No impact	No impact	No impact	No impact	No change
• PCBs	No impact	No impact	No impact	No impact	No impact	No change
• Radon	No impact	No impact	No impact	No impact	No impact	No change
• Medical/Biohazardous Waste	No impact	No impact	No impact	No impact	No impact	No change

* Factors reflect change in Proposed Action and all alternatives over No-Action Alternative in 2013 (e.g., employment under Proposed Action is reduced by the number of DMT employees).

Table 2.6-4. Summary of Projected Environmental Impacts of Reuse of George AFB in the Year 1998*

Resource Category	Proposed Action	International Airport Alternative	Commercial Airport with Residential Alternative	General Aviation Center Alternative	Non-Aviation Alternative	No-Action Alternative
Natural Environment						
• Soils and Geology	Increase in erosion and alteration of natural surface and soil conditions (603 acres ground disturbance)	Increase in erosion and alteration of natural surface and soil conditions (1,432 acres ground disturbance)	Increase in erosion and alteration of surface and soil conditions (430 acres ground disturbance)	No impact due to limited new construction (220 acres ground disturbance)	Increase in erosion and alteration of natural surface and soil conditions (975 acres ground disturbance)	No impact
• Water Resources	Net increase to existing groundwater overdraft of 1 to 2 percent	Net increase to existing groundwater overdraft of 5 to 8 percent	Net increase to existing groundwater overdraft of 1 percent	Net increase to existing groundwater overdraft of 1 percent.	Net increase to existing groundwater overdraft of 1 percent	No impact
• Air Quality	Emissions of NO_x, ROG, and PM_{10} could interfere with attainment of standards	Emissions of NO_x, ROG, and PM_{10} could interfere with attainment of standards	Emissions of NO_x, ROG, and PM_{10} could interfere with attainment of standards	Emissions of NO_x, ROG, and PM_{10} could interfere with attainment of standards.	No impact	No impact
• Noise	Projected aircraft noise levels would expose no people to 65 DNL or greater. Traffic noise will expose 26 residences to 65 DNL or greater	Projected aircraft noise levels would expose 64, people to 65 DNL or greater. Traffic noise will expose 180 residences to 65 DNL or greater	Projected aircraft noise levels would expose no people to 65 DNL or greater. Traffic noise will expose 32 residences to 65 DNL or greater	Projected aircraft noise levels would expose no people to 65 DNL or greater. Traffic noise will expose 51 residences to 65 DNL or greater.	Traffic noise will expose 12 residences to 65 DNL or greater	No impact
• Biology	Maximum of 603 acres of vegetation will be altered or lost. 135 acres of potential desert tortoise habitat will be permanently lost	1,432 acres of vegetation will be altered or lost. 625 acres of potential desert tortoise habitat will be permanently lost	430 acres of vegetation will be altered or lost. 63 acres of potential desert tortoise habitat will be permanently lost	220 acres of vegetation will be altered or lost. 9 acres of potential desert tortoise habitat will be permanently lost.	975 acres of vegetation will be altered or lost. 300 acres of potential desert tortoise habitat will be permanently lost	No impact
• Cultural Resources	No impact on base	No impact on base	No impact	No impact	No impact	No impact

* Impacts reflect change over post-closure conditions in 1998.

Table 2.6-5. Summary of Projected Environmental Impacts of Reuse of George AFB in the Year 2003*

Resource Category	Proposed Action	International Airport Alternative	Commercial Airport with Residential Alternative	General Aviation Center Alternative	Non-Aviation Alternative	No-Action Alternative
Natural Environment						
• Soils and Geology	Increase in erosion and alteration of natural surface and soil conditions (1,390 acres ground disturbance)	Increase in erosion and alteration of natural surface and soil conditions (6,086 acres ground disturbance)	Increase in erosion and alteration of surface and soil conditions (1,315 acres ground disturbance)	No impact due to limited new construction (220 acres ground disturbance)	Increase in erosion and alteration of surface and soil conditions (2,139 acres ground disturbance)	No impact
• Water Resources	Net increase to existing groundwater overdraft of 3 percent	Net increase to existing groundwater overdraft of 6 to 8 percent	Net increase to existing groundwater overdraft of 1 to 2 percent	Net increase to existing groundwater overdraft of 1 to 2 percent	Net increase to existing groundwater overdraft of 1 percent	No impact
• Air Quality	Emissions of NO_x, ROG, and PM_{10} could interfere with attainment of standards	Emissions of NO_x, ROG, and PM_{10} could interfere with attainment of standards	Emissions of NO_x, ROG, and PM_{10} could interfere with attainment of standards	Emissions of NO_x, ROG, and PM_{10} could interfere with attainment of standards	No impact	No impact
• Noise	Projected aircraft noise levels would expose no people to 65 DNL or greater. Traffic noise will expose 32 residences to 65 DNL or greater	Projected aircraft noise levels would expose 293 people to 65 DNL or greater. Traffic noise will expose 218 residences to 65 DNL or greater	Projected aircraft noise levels would expose no people to 65 DNL or greater. Traffic noise will expose 44 residences to 65 DNL or greater	Projected aircraft noise levels would expose no people to 65 DNL or greater. Traffic noise will expose 88 residences to 65 DNL or greater	Traffic noise will expose 76 residences to 65 DNL or greater	No impact
• Biology	1,390 acres of vegetation will be altered or lost. 925 acres of potential desert tortoise habitat will be permanently lost	6,086 acres of vegetation will be altered or lost. 4,237 acres of potential desert tortoise habitat will be permanently lost	1,315 acres of vegetation will be altered or lost. 543 acres of potential desert tortoise habitat will be permanently lost	220 acres of vegetation will be altered or lost. 9 acres of potential desert tortoise habitat will be permanently lost	2,139 acres of vegetation will be altered or lost. 830 acres of potential desert tortoise habitat will be permanently lost	No impact
• Cultural Resources	No impact on base	No impact on base	No impact	No impact	No impact	No impact

* Impacts relect change over post-closure conditions in 2003.

Table 2.6-6. Summary of Projected Environmental Impacts of Reuse of George AFB in the Year 2013*

Resource Category	Proposed Action	International Airport Alternative	Commercial Airport with Residential Alternative	General Aviation Center Alternative	Non-Aviation Alternative	No-Action Alternative
Natural Environment						
• Soils and Geology	Increase in erosion and alteration of natural surface and soil conditions (2,641 acres ground disturbance)	Increase in erosion and alteration of natural surface and soil conditions (7,087 acres ground disturbance)	Increase in erosion and alteration of surface and soil conditions (2,568 acres ground disturbance)	No impact due to limited new construction (220 acres ground disturbance)	Increase in erosion and alteration of natural surface and soil conditions (3,762 acres ground disturbance)	No impact
• Water Resources	Net increase to existing groundwater overdraft of 4 to 5 percent	Net increase to existing groundwater overdraft of 8 to 11 percent	Net increase to existing groundwater overdraft of 2 to 3 percent	Net increase to existing groundwater overdraft of 1 to 2 percent	Net increase to existing groundwater overdraft of 1 to 2 percent	No impact
• Air Quality	Emissions of NO_x, ROG, PM_{10} could interfere with attainment of standards	Emissions of NO_x, ROG, PM_{10} could interfere with attainment of standards	Emissions of NO_x, ROG, PM_{10} could interfere with attainment of standards	Emissions of NO_x, ROG, PM_{10} could interfere with attainment of standards	Emissions of NO_x, ROG, PM_{10} could interfere with attainment of standards	No impact
• Noise	Projected aircraft noise levels would expose no people to 65 DNL or greater. Traffic noise will expose 59 residences to 65 DNL or greater	Projected aircraft noise levels would expose 128 people to 65 DNL or greater. Traffic noise will expose 417 residences to 65 DNL or greater	Projected aircraft noise levels would expose no people to 65 DNL or greater. Traffic noise will expose 97 residences to 65 DNL or greater	Projected aircraft noise levels would expose no people to 65 DNL or greater. Traffic noise will expose 112 residences to 65 DNL or greater	Traffic noise will expose 136 residences to 65 DNL or greater	No impact
• Biology	2,641 acres of vegetation will be altered or lost. 1,333 acres of potential desert tortoise habitat will be permanently lost	7,087 acres of vegetation will be altered or lost. 5,112 acres of potential desert tortoise habitat will be permanently lost	2,568 acres of vegetation will be altered or lost. 953 acres of potential desert tortoise habitat will be permanently lost	220 acres of vegetation will be altered or lost. 9 acres of desert tortoise habitat will be permanently lost	3,762 acres of vegetation will be altered or lost. 1,233 acres of potential desert tortoise habitat will be permanently lost	No impact
• Cultural Resources	No impact on base	No impact on base	No impact	No impact	No impact	No impact

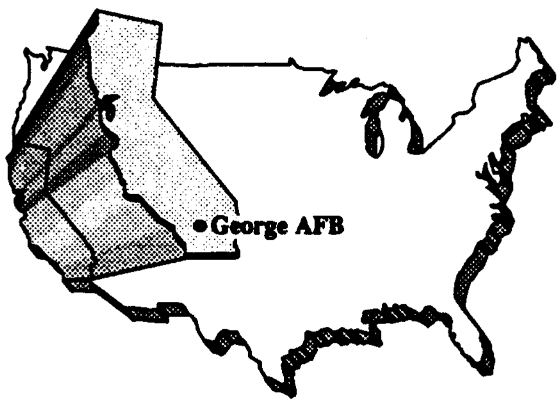
* Impacts reflect change over post-closure conditions in 2013.

Table 2.6-7. Summary of Project-Related Influencing Factors Associated with Other Land Use Concepts

Resource Category	Department of Justice	Department of Interior	Department of Housing and Urban Development	Department of Transportation	Department of Education	San Bernardino County Work Furlough Program	Medical Facilities
Local Community							
• Population (Victor Valley)	Increase of 2,375 (inmates)	No impact on population	No impact on population	No impact on population	Increase of 1,161 (students)	Increase of 200 (inmates)	No impact on population
• Direct Employment	Net decrease of 2,480 jobs (Proposed Action and International Airport); increase of 1,000 jobs (Commercial Airport with Residential, General Aviation Center, and Non-Aviation)	Net decrease of 205 jobs (International Airport), 960 jobs (Proposed Action), or increase of 5 jobs (Non-Aviation)	Net decrease of 677 jobs (Proposed Action) or 1,700 jobs (International Airport)	No impact on employment	Net decrease of 578 jobs (Proposed Action) or 45 jobs (International Airport)	Net decrease of 480 jobs (Proposed Action) or 102 jobs (International Airport)	Net decrease of 327 jobs (Proposed Action), or 915 jobs (International Airport)
• Traffic (Annual average daily trips)	Net decrease for Proposed Action (7.1 percent), International Airport (7.6 percent), Commercial Airport with Residential (17.6 percent), and Non-Aviation (21.3 percent); net increase of 2.7 percent for General Aviation Center	Net decrease of 0.2 percent for International Airport	Net decrease for Proposed Action (0.7 percent) and International Airport (1.4 percent)	No impact on traffic	Net decrease for Proposed Action (0.8 percent) and International Airport (0.2 percent)	Net decrease for Proposed Action (2.2 percent) and International Airport (0.1 percent)	Net decrease for Proposed Action (1.2 percent) and International Airport (1.3 percent)
• Flight Operations (annual)	No impact on flight operations	No impact on flight operations	No impact on flight operations	No impact on flight operations	No impact on flight operations	No impact on flight operations	No impact on flight operations
• Utilities Demand	Decrease for Proposed Action (10 percent) and International Airport (5 percent); increase for Commercial Airport with Residential (5 percent) and Non-Aviation (8 percent)	No impact on utilities	Decrease for Proposed Action (5 percent) and International Airport (3 percent)	No impact on utilities	No impact on utilities	Decrease of 5 percent for Proposed Action	No impact on utilities
• Land Use	No impact	No impact	Incompatible land use for Proposed Action and International Airport	Incompatible land use for Non-Aviation	Incompatible land use (schools only) for Proposed Action and International Airport	Incompatible land use for Proposed Action and International Airport	No impact
Hazardous Materials/Waste	No impact	No impact	No impact	No impact	No impact	No impact	No impact

Table 2.6-8. Summary of Projected Environmental Impacts Associated with Other Land Use Concepts

Resource Category	Department of Justice	Department of Interior	Department of Housing and Urban Development	Department of Transportation	Department of Education	San Bernardino County Work Furlough Program	Medical Facilities
• Soils and Geology	Short term impacts to soils during construction	No impact	No impact	No impact	Minor impact	Minor impact	No impact
• Water Resources	Decrease in demand for Proposed Action (10 percent), Non-Aviation (8 percent), and International Airport and Commercial Airport with Residential (5 percent)	No impact	No impact	No impact	No impact	No impact	No impact
• Air Quality	Slight increase in air emissions	Slight increase in air emissions	Slight decrease in air emissions	No impact	Decrease in emissions due to reduced vehicular traffic	Slight increase in air emissions	Slight increase in air emissions
• Noise	No impact	No impact	No impact	No impact	No impact	No impact, if facilities are located outside the 65 dB contour	No impact
• Biological	Potential loss of desert tortoise habitat (maximum 580 acres); loss of vegetation and wildlife habitat due to construction	No impact	No impact	No impact	No impact	No impact	No impact
• Cultural Resources	No impact	No impact	No impact	No impact	No impact	No impact	No impact



CHAPTER 3
AFFECTED ENVIRONMENT

3.0 AFFECTED ENVIRONMENT

This chapter describes the environmental conditions of George AFB and its ROI as it would be at the time of base closure. The disposal and reuse of George AFB may influence the surrounding communities of Adelanto, Victorville, Apple Valley, and Hesperia.

3.1 INTRODUCTION

This chapter provides information to serve as a baseline from which to identify and evaluate environmental changes. Although this EIS focuses on the biophysical environment, some non-biophysical elements, or influencing factors are addressed to the extent that they directly impact the environment. The non-biophysical elements of population and employment, land use and aesthetics, public utility systems, and transportation networks in the region and local communities are addressed. This chapter also describes hazardous materials found on base, storage tanks, asbestos, herbicides and pesticides, polychlorinated biphenyls (PCBs), radon, medical and biohazardous waste, and the IRP process. Finally, it describes the pertinent natural resources of soils and geology, water resources, air quality, noise, biological resources, and cultural resources.

The ROI to be studied will be defined for each resource area affected by the Proposed Action and alternatives. The ROI determines the geographical area to be addressed as the affected environment. Although the base boundary may constitute the ROI limit for many resources, potential impacts associated with certain issues (e.g., air quality, utility systems, and water resources) transcend these limits. ROIs are carefully delineated to produce an accurate basis for analysis regarding base disposal and reuse impacts.

The baseline conditions assumed for the purposes of analysis in this document are the conditions projected at base closure. Impacts associated with disposal and/or reuse activities may then be addressed separately from the impacts associated with base closure. The closure EIS (U.S. Air Force, 1990e) addressed the general preclosure conditions and impacts of closure. A reference to preclosure conditions is provided, where appropriate (e.g., air quality) in this document, in order to provide a comparative analysis over time. This will assist the decision maker and agencies in understanding potential long-term impacts in comparison to conditions when the installation was active.

3.2 LOCAL COMMUNITY

3.2.1 Community Setting

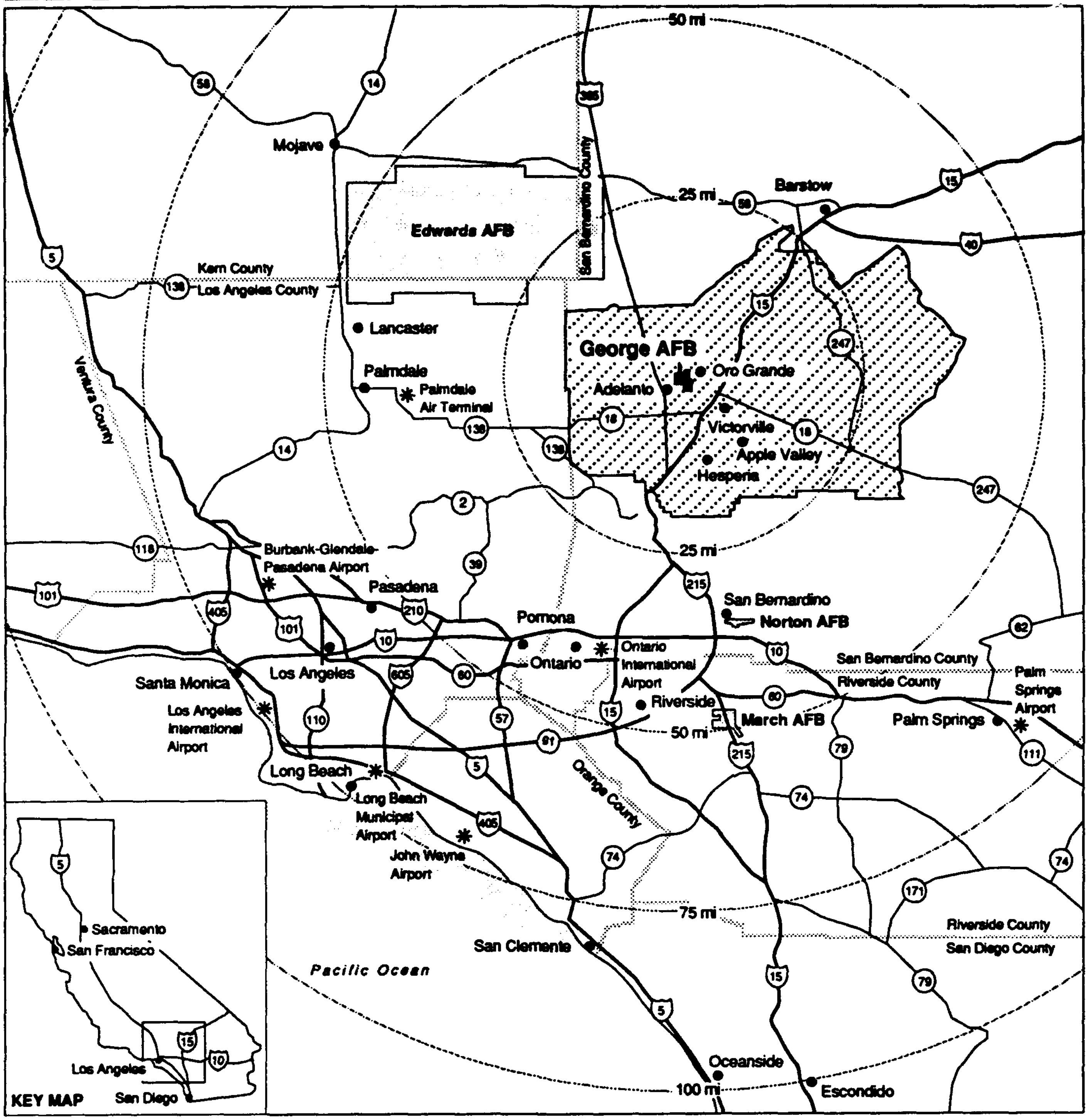
George AFB is in the Mojave Desert in southwestern San Bernardino County, California (Figure 3.2-1). The base is bordered by the cities of Adelanto to the west and southwest and Victorville to the southeast. The base is situated in a geographic subregion of the southwestern Mojave Desert known as the Victor Valley. This analysis utilizes census tract boundaries to approximate the geographic area known as the Victor Valley. These boundaries are illustrated in Figure 3.2-1. It is also called the "High Desert," designated as such by virtue of its elevation of approximately 3,000 feet, in contrast to the below-sea level Colorado and Sonoran deserts to the southeast. Most of the population of the Victor Valley reside in the cities of Adelanto, Victorville, and Hesperia and the town of Apple Valley.

The two-county (San Bernardino and Riverside) area is considered the ROI for purposes of describing and analyzing employment effects. Because the greatest job and population effects are expected to occur in the Victor Valley, the valley is used as an area of concentrated study for community impacts in this EIS.

The populations of San Bernardino and Riverside counties were among the four fastest growing in California during the 1980s. The two-county ROI increased in population from 1.6 million in 1980 to 2.6 million in 1990, an average annual growth rate of 5.2 percent during the decade. All Victor Valley communities witnessed even more rapid population growth during the 1980s, particularly during the last half of the decade when the valley was the fastest growing portion of San Bernardino County. Average annual rates of population growth for key area communities from 1980 to 1990 were as follows:

- Adelanto, 14.7 percent
- Apple Valley, 12.4 percent
- Hesperia, 14.1 percent
- Victorville, 11.1 percent.

The populations of Adelanto and Hesperia nearly quadrupled between 1980 and 1990, and both Apple Valley and Victorville tripled in population during the decade. Both San Bernardino and Riverside counties are projected to continue their rapid growth through the year 2020. Based on results of the 1990 census, the Victor Valley communities had the following population figures in April 1990: Victorville 40,700, Adelanto 8,500, Hesperia 50,400, and Apple Valley 46,100. At the time of base closure (January 1993), the population of the Victor Valley is projected to be 196,200.



EXPLANATION

- Airports
- "Victor Valley" Census Tracts
- Interstate Highway
- U. S. Highway
- State Highway

0 5 10 20 Miles

Regional Map

Figure 3.2-1

In 1989, George AFB had a total military-related population of 13,291, which included 4,346 permanent parties and 8,945 military dependents. An additional 2,537 military retirees are associated with the base. The on-base population decreased slightly between the fiscal years 1989 and 1990, although the number of military retirees living in the area has gradually increased. The total military-related population, including all military personnel and their dependents, increased by 1,741 between 1987 and 1990. At closure, the base-related population will decrease to approximately 50 DMT employees.

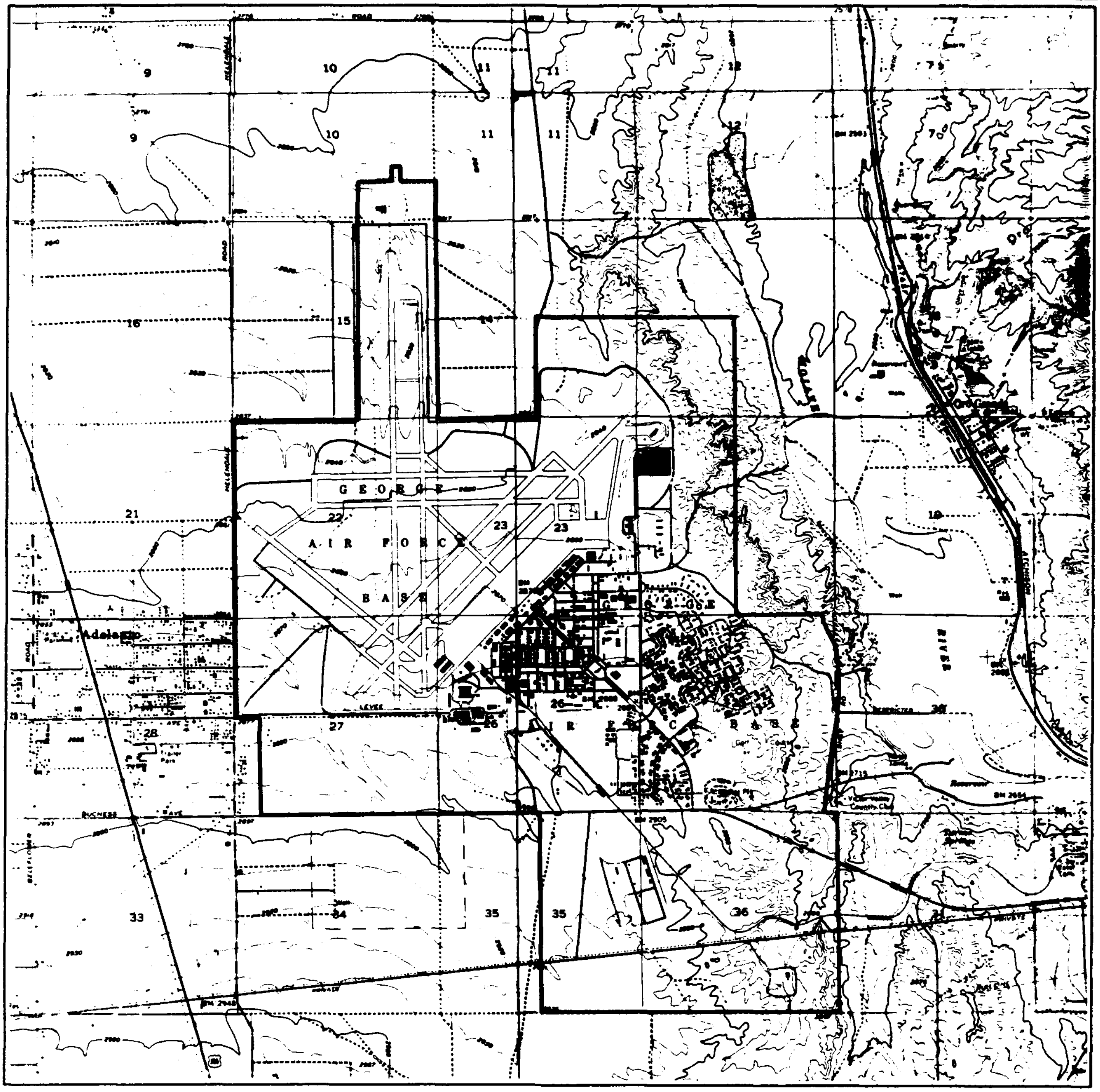
The two-county ROI has become less dependent on military jobs since 1970. Civilian jobs increased from 375,000 in 1970 to 821,000 in 1988, or an average gain of 4.5 percent per year. Military jobs increased from 34,000 in 1970 to just 35,000 in 1988, for an average rise of only 0.1 percent annually.

In 1990, there were an estimated 34,100 jobs in the Victor Valley. Currently, the largest employers in the Victor Valley are George AFB, Continental Telephone of California (Contel), the Victor Valley School District, the Hesperia Unified School District, and the Southwest Portland Cement Company (with at least 900 jobs at each organization). A detailed analysis of socioeconomic conditions and potential impacts of the Proposed Action and alternatives is provided in the *Socioeconomic Impact Analysis Study* (U.S. Air Force, 1991c).

As with many facets of San Bernardino and Riverside counties, housing growth increased dramatically during the 1980s. The most rapid housing growth in San Bernardino County occurred in the Victor Valley. The number of housing units constructed in Adelanto, Apple Valley, and Hesperia nearly tripled between 1980 and 1990 in response to an increased demand. Similarly, the number of units constructed in Victorville increased by approximately two and one-half times over the same period. Estimated 1990 vacancy rates were high in all Victor Valley communities except Victorville, although these figures largely reflect recent rapid construction of new housing.

George AFB comprises 5,073 acres (Figure 3.2-2), half of which is virtually flat (less than 2 percent slope), making this area suitable for aircraft runways. The base topography generally slopes downward toward the northeast. The base is located on a slight ridge and some sloping occurs toward the north and northwest. The highest base elevation is 2,920 feet mean sea level (MSL) at the southwestern corner of the base, south of Air Base Road, and the lowest elevation is roughly 2,650 feet MSL at the northeastern corner of the base. The eastern edge of the base, adjacent to the Mojave River, contains scattered areas (a total of about 100 acres) of slopes greater than 25 percent.

Winter temperatures in some desert areas range near zero, often compounded by the wind chill factor. In the summer, temperatures can reach as high as 120 degrees Fahrenheit in the lower elevations. Rainfall and humidity are generally low. Precipitation throughout the desert is less than 4 inches per year,



Vicinity Topographic Map

0 1000 2000 4000 Feet

Figure 3.2-2

and usually occurs over a short duration with high intensity. The resulting flash floods rapidly modify the terrain that is exposed to the erosive surface runoff. Usually, heavy or persistent rains cause the temporary filling of a number of dry lakes until the surface water evaporates or infiltrates into the soil. The sparse vegetation in the high desert is represented by sage brush and creosote scrub, and pinon-juniper and Joshua tree woodlands.

Access to the George AFB area is provided by several highways. U.S. Highway 395 runs north-south through Adelanto about 1 mile west of the base. Access from the south and northeast is provided by Interstate 15 (I-15), which runs through Victorville and is the major route between Los Angeles, California, and Las Vegas, Nevada. Access to this region from the west and east is provided by State Route (SR) 18, which runs through Victorville and south of Adelanto. These highways can be reached from the base via Adelanto Road, which runs along the western boundary of the base, and Air Base Road, which runs along the southern end of the base.

AMTRAK provides direct passenger rail service from Victorville north to Las Vegas and south to San Bernardino and Los Angeles. The Union Pacific and Atchinson Topeka and Santa Fe (AT&SF) railroads provide service from Victorville. Piggyback service is available for pickup and delivery by the AT&SF Railroad; however, the Union Pacific Railroad requires independent carrier service.

Although small airports designed for recreational use and pilot training operate in the Victor Valley (Adelanto, Apple Valley, and Hesperia), the largest major airport serving the region is Ontario International Airport, approximately 45 miles southwest of George AFB. Ontario International Airport is served by at least eight major carriers with direct or connecting flights to all major cities in the nation. Limousine/shuttle service is available between the Victor Valley and the Ontario Airport.

3.2.2 Installation Background

George AFB was established in 1941 as the Victorville Army Airfield to train pilots and bombardiers serving in World War II. At the end of the war, the airfield was deactivated and used for storage. It was reactivated in 1950 and renamed George AFB in honor of Brigadier General Harold H. George. The base was developed in a relatively isolated area to avoid land-use conflicts. Support communities existed and were established close to the base. In 1951 Tactical Air Command (TAC) assumed responsibility for base operations. George AFB is currently the home of the 35th Fighter Wing, under TAC.

The base contains its own housing, schools, hospital, commercial, and recreational facilities, as well as the operational air base. Most of the base development took place in the 1940s through the 1960s and many World War II

buildings are still in existence. Expansion and base improvements continued through the 1980s, but ceased after base closure was announced.

3.2.3 Land Use and Aesthetics

This section describes the land uses and aesthetics for the base property and the surrounding areas of George AFB at base closure. Projected land uses at closure are assumed to be similar to existing land uses in the vicinity of the base. The ROI includes the base property and potentially affected adjacent properties that are within the jurisdiction of the cities of Adelanto and Victorville and portions of San Bernardino County.

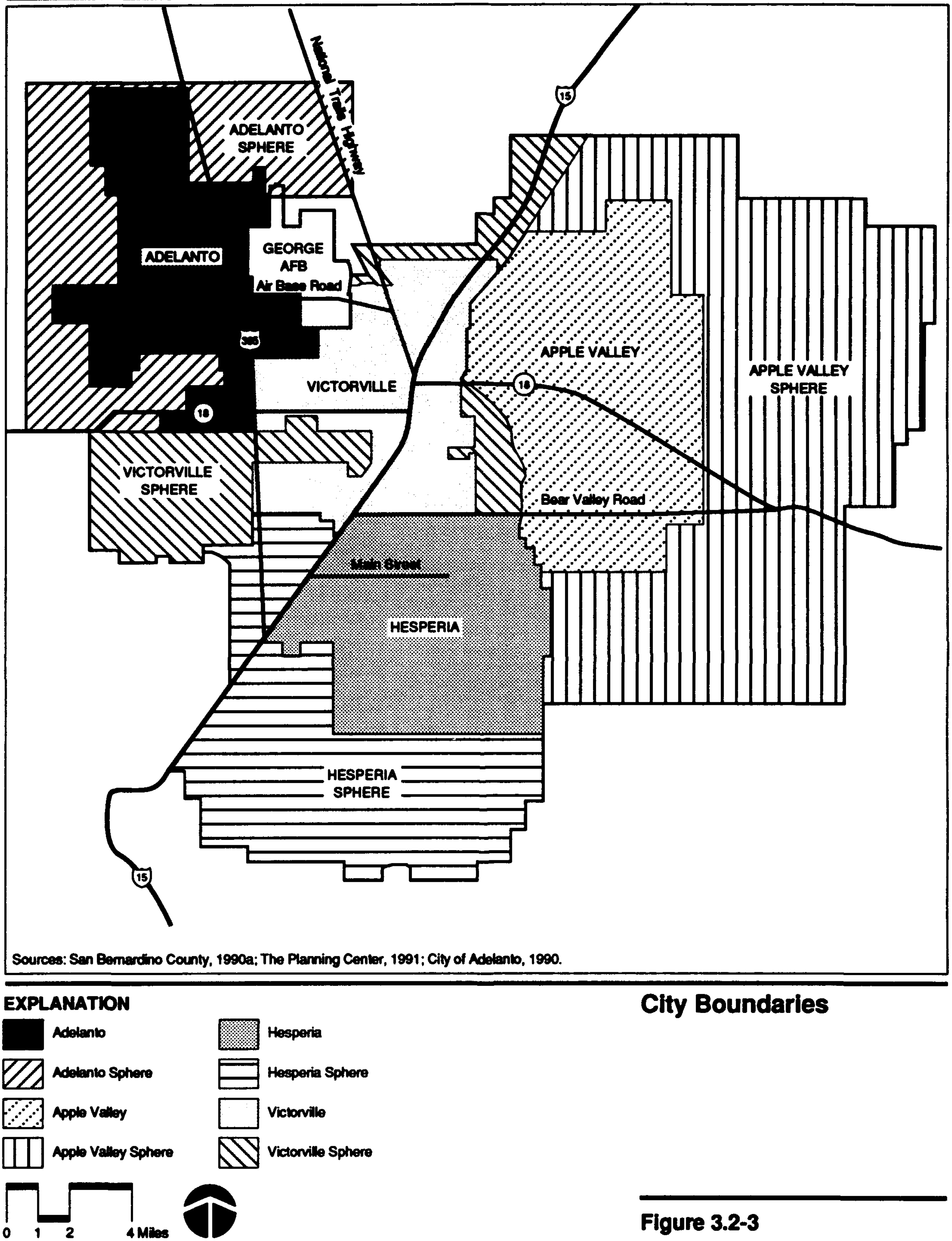
George AFB is owned by the U.S. Government. However, approximately 260 acres in the southwest corner of the base are within the jurisdictional boundaries of the city of Adelanto (Figure 3.2-3). The remaining base area is unincorporated and, unless transferred within the federal government, would fall under the jurisdiction of San Bernardino County after the Air Force disposes of the base property. A 274-acre avigational easement is located south of the north-south runway and Air Base Road. This easement is considered perpetual and assignable, and has no expiration date.

George AFB adjoins the communities of Adelanto and Victorville. Adelanto is located to the north, west, and southwest of George AFB; Victorville is located to the east and southeast of the base. These communities regulate planning, zoning, and subdivision control within their respective boundaries and have extraterritorial jurisdiction for planning and subdivision review outside those boundaries. Other unincorporated areas surrounding the base are under the jurisdiction of San Bernardino County, which regulates zoning and subdivision control.

3.2.3.1 Land Use

On-Base Land Use. George AFB will continue to provide base support for the 35th Fighter Wing, tenant units, Air National Guard, and miscellaneous agencies until base closure. The base property, which comprises 5,073 acres, includes the following general land uses:

Land Use	Acreage
Aviation support	133
Airfield	2,418
Industrial	197
Medical	12
Educational	36
Commercial	134
Public/recreational	316
Residential	386
Vacant Land	1,441
TOTAL	5,073



Sources: San Bernardino County, 1990a; The Planning Center, 1991; City of Adelanto, 1990.

City Boundaries

Figure 3.2-3

The existing land uses for George AFB and vicinity are shown in Figure 3.2-4. The following text briefly describes on-base land use categories.

The **aviation support** areas contain facilities for aircraft ground equipment and jet engine maintenance. The facilities include aircraft repair hangars, equipment repair shops, and administrative offices. Reflecting the base's primary mission, aviation support areas occupy a large portion of the land at George AFB and are located between the airfield and the cantonment area.

The **airfield** land use at George AFB contains facilities to support an active military flying installation with an operational airfield. The airfield consists of two runways of the following lengths/widths:

Runway 17/35 - 10,050 by 150 feet
Runway 03/21 - 9,126 by 150 feet

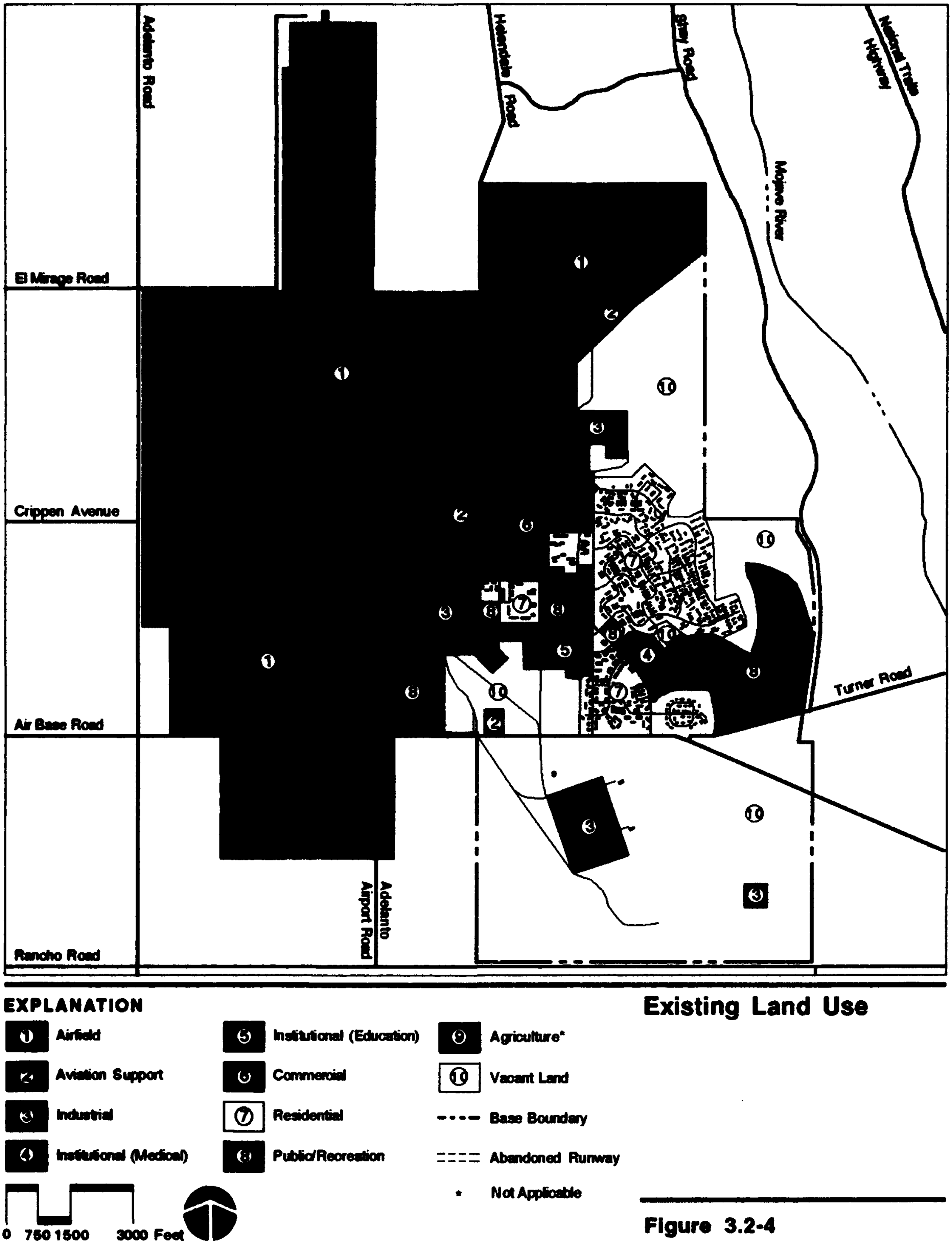
Navigational aids on Runway 17/35 include high-intensity runway lights, strobe lights, approach lighting, and radar reflectors. Runway 03/21 has the same navigational aids, minus strobe lights. The airfield components are generally well maintained and in good condition. A renovated aircraft control tower and new fire department facility are located adjacent to the flightline at the northern terminus of Cory Boulevard. Three large aircraft hangars, a number of smaller hangars, office facilities, warehouses, and maintenance facilities are also located along the flightline. An extensive on-base liquid fuels system, including a bulk storage and flightline distribution system, has been developed to support aviation operations.

The **industrial** area of the base is northwest of Phantom Road near the flightline. Facilities used for aviation maintenance and warehousing are generally in good condition with a mixture of new and old buildings. The munitions storage area, south of Air Base Road, includes a new administrative building.

The **medical** area, in the southeast portion of the base north of Air Base Road, includes the renovated base hospital with a new, attached structure. The facility provides a full range of medical and dental services.

The **educational** area, in the southeast portion of the base north of Air Base Road, includes two elementary schools owned and operated by the Adelanto School District on government land. The terms of the lease provide that the facilities would revert back to the Air Force if the schools are vacated.

The office facilities in the **commercial** area are generally located in the central part of the cantonment area near Cory Boulevard. Several of these office buildings, including the Air Division Headquarters and the Resource Managers complex, were recently constructed and are generally in good to excellent condition.



Existing Land Use

Figure 3.2-4

An additional on-base **commercial area** supports both retail and service needs of base personnel. Facilities include the base exchange, commissary, bowling alley, mini-mall, credit union, bank, beverage store, fast-food restaurant, automobile service station, post office, child care center, movie theater, and temporary lodging facilities. The fast-food restaurant (Burger King), post office, and beverage store have been constructed since 1985.

Public/recreational facilities include a 9-hole golf course in the southeast area of the base adjacent to base housing. The course includes a clubhouse/pro shop, a new golf cart barn, and driving range. Indoor recreational facilities include a gymnasium that is equipped with racquetball courts, weight room, basketball court, dressing rooms, and sauna.

A large park, including a pool, is located close to the base gymnasium. Additional swimming pools are located at the Officers' and NCOs' Clubs. Within the base cantonment, there are tennis courts in two locations, in addition to six baseball fields, two of which are Little League baseball fields.

Additional facilities include a recreational center, arts and crafts center, an auto hobby shop, and skeet shooting range. There is also an athletic field and running track to the west of the elementary schools that is currently not used.

The **residential** areas at George AFB include single- and multiple-family housing units and dormitories.

The George AFB **family housing** area consisting of 1,641 units is located on the eastern part of the base, north of Air Base Road. The housing consists of 1,617 multiple-family units and 24 single-family homes. The buildings were constructed between 1951 and 1966, have been well maintained, and are generally in good condition. Most units have been renovated over the years. Open space areas and playgrounds are located throughout the entire housing complex. The housing area is well landscaped with grass yards and large shade trees. Parking areas are limited and there are only a few garages.

There are 1,786 units of **dormitory and temporary lodging facilities** in two separate areas on the base. The newer dormitories include separate dayroom/laundry structures. There are also separate parking lots available for each of the buildings, as well as two dining hall facilities. Rooms in the newer dormitories have individual exterior entries and private bathroom facilities, whereas the rooms in the older buildings exit to a common hallway and have common bathroom facilities. There are no cooking facilities within any of the dormitory rooms.

The existing undeveloped **vacant land** areas at George AFB are primarily located near the residential and industrial areas. These are generally

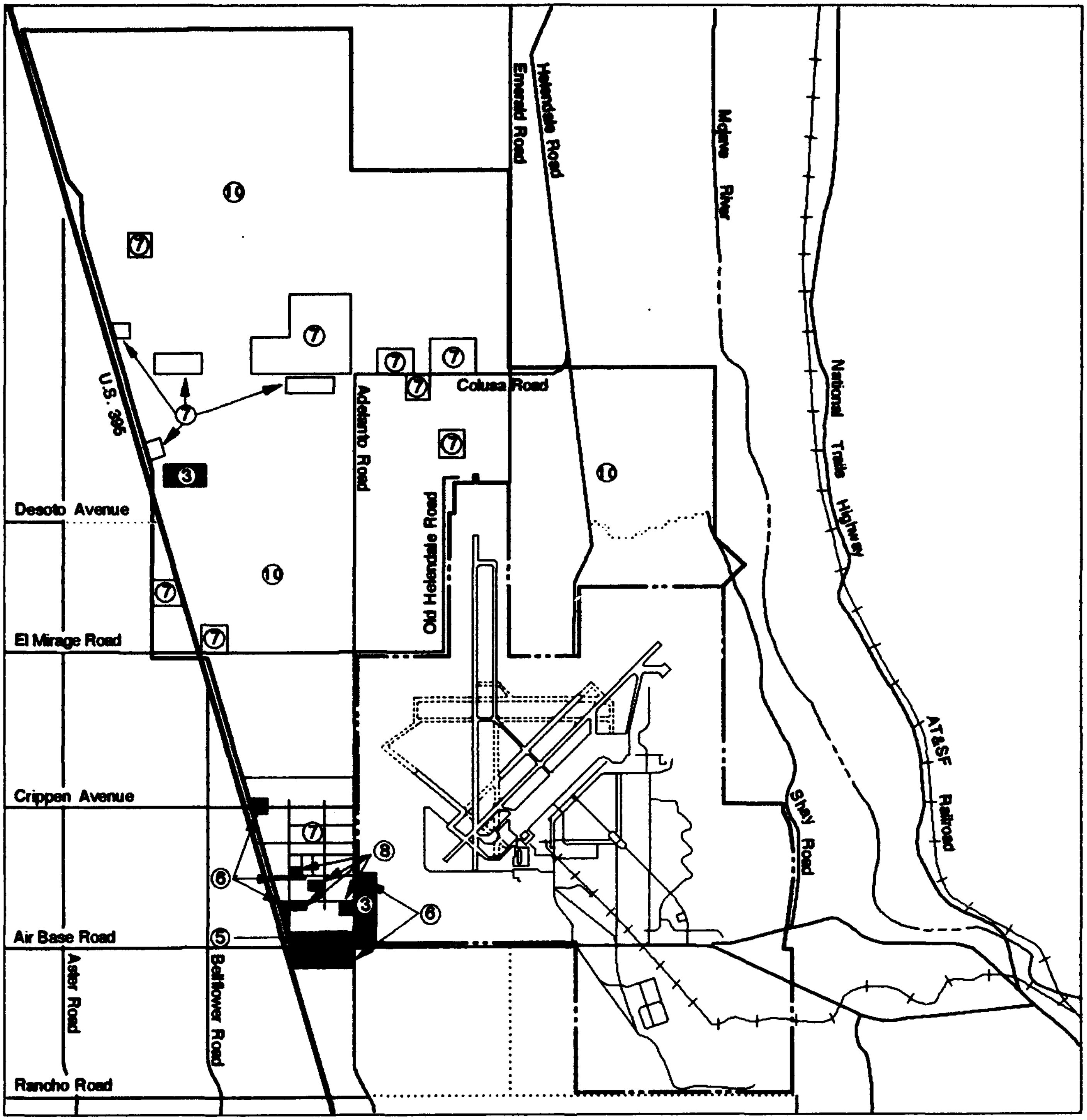
developable except for areas with 15 percent or greater slopes along the eastern base boundary.

Adjacent Land Use. George AFB is adjacent to the cities of Adelanto to the west/southwest and Victorville to the east and southeast. Approximately 260 acres in the southwest corner of the base is within Adelanto's city limits. This area is zoned open space-public land (OS-PL). The majority of land adjacent to the base is privately owned and is zoned for residential, commercial, and industrial uses. Figure 3.2-5 depicts land uses of the developed areas in the vicinity of George AFB.

In the city of Adelanto there is an urbanized area of 1,000 acres that is bounded by Air Base Road on the south, Crippen Avenue on the north, U.S. 395 on the west, and the base boundary on the east. This area contains 458 stucco or wood-frame residences, 2 apartment complexes, 4 government facilities (Adelanto Fire Station, police station, U.S. Post Office, and the Adelanto School District offices), 23 commercial establishments, 4 churches, and some industrial development. The residential uses within this area are concentrated in the northern portion and scattered throughout this urbanized area. The churches, apartments, and public facilities are located throughout the area. Commercial uses are generally located along U.S. 395 and Air Base Road. The light industrial uses are located along the west side of the base between Adelanto Road and the base

Another growth area in Adelanto, where sporadic development has occurred, is bounded by U.S. 395 on the east, Crippen Avenue on the north, Mojave Drive on the south, and extends westward approximately three miles to Koala Road. This area is zoned for a mix of residential, industrial, and commercial uses and contains several recent housing and industrial park developments, including apartment, mobile home, and single-family projects along Lee, Bartlett, and Lawson Avenues, and along Air Base Road. A large industrial development is located northeast of the Los Angeles Department of Water & Power (LADWP) power plant at Rancho Road and Raccoon Avenue. The Adelanto Correctional Facility is also located in this area. Other large parcels are developed or are under construction southwest of the power plant and along Rancho Road eastward to Bellflower Road.

Immediately to the north of the urbanized area of Adelanto and north of the base is an area of 7,000 acres that is mainly vacant desert land with scattered rural residences. This area is within Adelanto and its sphere of influence. The area is generally bounded by the base on the south, midway between Terosa Road and Madera Road on the north, U.S. 395 on the west, and Helendale Road on the east. The residences consist of 16 modular homes and 15 houses. In addition there are five trailer houses occupied in this area. The majority of the modular homes and houses are located in two sections 1-1/2 miles north/northwest of the northern end of the north-south runway. In addition, a



EXPLANATION

- 1 Airfield*
- 2 Aviation Support*
- 3 Industrial
- 4 Institutional (Medical)*
- 5 Institutional (Education)
- 6 Commercial
- 7 Residential
- 8 Public/Recreation
- 9 Agriculture*
- 10 Vacant Land
- Base Boundary
- Abandoned Runway
- Dirt Road
- * Not Applicable

0 1/4 1/2 1 Mile

Existing Off-Base Land Use

Figure 3.2-5

horse ranch, an automobile wrecking yard, and some abandoned wood-frame buildings are present in this area. To the northeast of the north-south runway, the off-base land is vacant desert with no residential development.

Land uses southwest and south of the base are dominated by open space with pockets of commercial or industrial development at major intersections. Commercial land uses are located along Bartlett Avenue and U.S. 395. The new City Government Center is located on Air Base Road, at U.S. 395, with more generally isolated commercial development occurring eastward to Adelanto Road. A large industrial land use is located east of Adelanto Road, north of Rancho Road.

The county of San Bernardino borders George AFB on the east and north. Within this area the Mojave River channel lies approximately 0.25 mile east of the base at its closest point. Presently, there is some scattered housing development in this area about 1.5 miles north of Air Base Road, between the base and the river. About 0.5 mile north of the northeast corner of the base is the Victor Valley Regional Wastewater Facility.

The city of Victorville borders George AFB on the east and the eastern portion of the south base boundary. Existing development within the city of Victorville, adjacent to George AFB, is generally confined to residential development along both sides of Village Drive, starting approximately 0.5 mile south of Air Base Road and continuing south to Mojave Drive. In addition, new residential development is proposed south of Air Base Road. Two new single-family residential developments including 336 acres are proposed adjacent to Village Drive. The densities of these developments range from 2.9 to 3.6 dwelling units per acre (Victorville Planning Department, 1991). The remaining areas in Victorville adjacent to the base are undeveloped, and planned for industrial development as indicated in the Victorville General Plan (Cotton, Beland and Associate, 1988).

Land Use Plans. The cities of Adelanto and Victorville and the county of San Bernardino have jurisdiction over the lands adjacent to the base (see Figure 3.2-3). Each of these entities has a General Plan. The city of Adelanto has adopted the land use plan, not the entire General Plan (The Planning Center, 1990a), as the interim policy direction the city plans to implement. The plan covers 20,000 acres, including George AFB, and proposes the development of an international airport facility. The plan also includes noise-compatible land uses, such as manufacturing, industrial, and business parks, in the projected overflight areas. The city of Victorville's General Plan (Cotton, Beland and Associate, 1988) indicates light industrial uses adjacent to the southeast portion of George AFB. Their plan also includes some commercial areas and indicates a flood plain along the Mojave River. The *San Bernardino County General Plan* (San Bernardino County, 1990c) indicates a floodway along the Mojave River and agricultural/low density residential

development (10-acre minimum parcel size) to the east of the base. The county plan includes a 5-acre minimum parcel size for low-density residential uses north of the base.

Air Force Policies Affecting Adjacent Land Uses. The Air Force developed the Air Installation Compatible Use Zone (AICUZ) program to minimize development that is incompatible with aviation operations in areas on and adjacent to military airfields. Municipalities that have land located within the AICUZ are not required to zone this land in accordance with the AICUZ. However, the Air Force encourages cooperation by such jurisdictions when making land use decisions.

The AICUZ land use recommendations for areas near a military airfield are based on two composite studies. One study addresses compatible land uses based on exposure levels to aircraft noise. The other addresses safety issues and identifies the areas with hazard potential due to aircraft accidents and obstructions to air navigation. Then the composite study is prepared with the safety zones and noise contours combined to make 13 Compatible Use Districts (CUDs). CUDs are delineated specifically for each individual Air Force base, using operational information derived from the base mission. An AICUZ report for George AFB was issued in 1983 (U.S. Air Force, 1983).

The AICUZ program applies only to military airfields. Similar criteria are *established by the FAA for civilian airports.* With the closure of George AFB, FAA criteria will apply to airport activities.

AICUZ Noise Considerations. AICUZ noise contours are based on composite noise ratings that are calculated from flight patterns, numbers and types of aircraft, power settings, times of operations, and climatic conditions (U.S. Air Force, 1983). A day-night weighted average sound level (DNL) is used to describe the noise environment.

Figure 3.4-3 shows the DNL noise contours for the baseline aircraft activity at George AFB. Within the DNL 65 dB contour, 8,970 acres are in Adelanto, 3,300 acres are in Victorville, and 15,120 acres are in San Bernardino County. The areas of Victorville and Adelanto most affected by noise are zoned for single-family residential and industrial use. Industrial use is generally compatible with noise levels of DNL 65 to 75 dB.

AICUZ Safety Considerations. The second objective of the AICUZ is to ensure that the areas surrounding the base are safe and that land uses in areas of high accident potential are properly planned. The AICUZ delineates areas at either end of the runway where the probability of aircraft accidents are highest. These areas have been identified through statistical analysis of past Air Force aircraft accidents in the vicinity of Air Force facilities worldwide. Based on accident risk, certain land use restrictions are recommended and identified by specific zones

known as the Clear Zone (CZ) and two Accident Potential Zones (APZs), APZ I and APZ II.

The area directly beyond either end of the runway is designated as a CZ. This zone extends for 3,000 feet from the end of the runway and is 2,000 to 3,000 feet wide centered on the extended runway centerline. The Air Force recommends no development in the CZ (U.S. Air Force, 1983). At George AFB, the CZ is applied to the ends of each of the two runways and within these CZs the land is undeveloped desert (Figure 3.2-4).

The APZs are located beyond the CZ. Each zone designates different specific allowable uses. APZ I extends beyond the CZ for 5,000 feet and is 3,000 feet wide. Industrial, agricultural, recreation, and open space uses are allowed in the APZ I. Residential and land uses that concentrate large numbers of people are discouraged in APZ I (U.S. Air Force, 1983). The APZ I at George AFB encompasses undeveloped desert, a horse ranch north of the base, and commercial, industrial, and residential development along Adelanto Road.

Low density residential and retail uses of low intensity are allowed in APZ II in addition to the uses allowed in APZ I. APZ II extends an additional 7,000 feet beyond APZ I and is 3,000 feet wide with a less critical accident potential rating. At George AFB, within APZ II there are approximately 20 residences (low-density) along National Trails Highway and southwest of U.S. 395.

San Bernardino County developed the Airport Land Use Commission (ALUC) to address potential land use compatibility/safety issues related to airport traffic which are designated on Hazards Overlay Maps. Noise-related aviation hazards are included in the Noise Element in the San Bernardino County General Plan (1990c).

Because airports do not own or control the land necessary to ensure the safety of their operations and adjacent land uses, the county of San Bernardino has adopted the following policies applicable to airports including George AFB, as follows:

- Adopt a Land Use Compatibility Aviation Chart, as set forth in the San Bernardino County General Plan (1990c).
- Adopt a safety area for George AFB that is one mile outside the existing 65 DNL contour line.
- Evaluate existing land uses for compatibility and amend through the General Plan Amendment process if land use conflicts exist.
- Continue the support of the ALUC in San Bernardino County including updating existing and initiating new comprehensive Land Use Plan studies for each airport in the county.
- Adopt the AICUZ Accident Potential Zone Maps and land use compatibility charts.

At George AFB the San Bernardino County Airport Safety Review Areas extend beyond the base boundary in all directions ranging from 1 to 5 miles. The county has not initiated action to revise these overlay maps to reflect base closure, pending decisions on reuse. If the reuse of George AFB includes an airport, San Bernardino County will need to revise safety zones and noise impacted areas maps. The zoning and general plans for each entity, with jurisdiction in the impacted area, will need to be updated once a decision on reuse is determined.

Closure Baseline. Under baseline conditions, George AFB would be closed and airfield operations would be terminated, removing all land use conflicts and constraints associated with the AICUZ. Land use restrictions contained in the San Bernardino County General Plan (1990c) and zoning/General Plans for the cities of Adelanto and Victorville presumably would remain in effect, however, until repealed or modified.

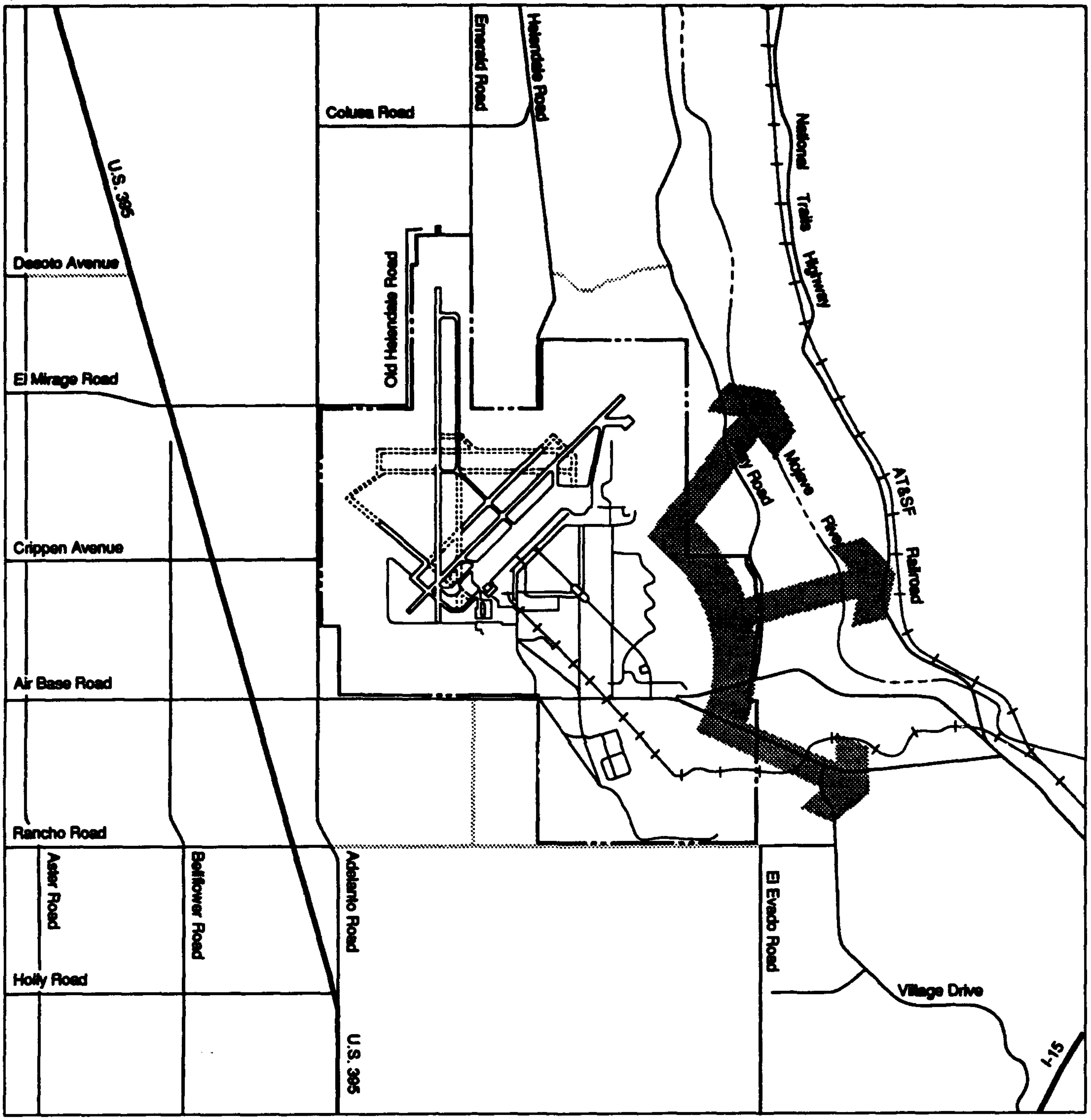
3.2.3.2 Aesthetics. Visual resources include natural and man-made features that give a particular environment its aesthetic qualities. Criteria used in the analysis of these resources include visual sensitivity, which is the degree of public interest in a visual resource and concern over adverse changes in its quality. Visual sensitivity is categorized in terms of high, medium, or low levels.

High visual sensitivity exists in areas where views are rare, unique, or in other ways special, such as in remote or pristine environments. High-sensitivity views would include landscapes that have landforms, vegetative patterns, water bodies, or rock formations of unusual or outstanding quality. Views from the east side of George AFB are considered to be of high visual sensitivity, and include the Mojave River in the foreground and Quartzite Mountain in the background. These views are mapped in Figure 3.2-6.

Medium visual sensitivity areas are more developed than those of high sensitivity. Human influence is more apparent in these areas and the presence of motorized vehicles and other evidence of modern civilization is commonplace. These landscapes generally have features containing varieties in form, line, color, and texture, but tend to be more common than high visual sensitivity areas. The residential areas with numerous mature trees, and the golf course and its related landforms are considered to be of medium visual sensitivity.

Low visual sensitivity areas tend to have minimal landscape features, with little change in form, line, color, and texture. The portions of George AFB not previously mentioned in terms of aesthetics are considered to have low visual sensitivity.

Only a few areas of George AFB are readily visible from off base. The west side of the base is visible from Adelanto Road, the south portion from Air Base Road,



EXPLANATION

Scenic Vista

Dirt Road

Base Boundary

Abandoned Runway

0 1/4 1/2 1 Mile

High Visual Sensitivity Map

Figure 3.2-6

and the east side from Shay Road. The base institutional and residential areas are not readily visible from off base.

The desert areas surrounding the base are generally of low visual sensitivity. The medium visual sensitivity area southwest of the base, in the city of Adelanto, is used for residential and some commercial purposes.

The aesthetics of George AFB, especially in the residential areas and along Cory Boulevard, have been enhanced by numerous landscape projects throughout the years. Trees have been planted along the streets in these areas and are now mature.

Other on-base improvement projects conducted in the 1980s include construction of the following major buildings and related landscaping:

- Dormitory complex
- Division headquarters
- Communications facility
- Fire station
- Squadron operations.

These new building projects have been constructed using masonry units or stucco to complement the base's original buildings.

Approximately half of the land at George AFB is vacant land. Recreational areas with associated open space provide visually pleasing views, especially eastward from the base. The 9-hole golf course has tree-lined fairways and many landforms that enhance the visual appeal of the course. The golf course offers panoramic views of the Mojave River and of Quartzite Mountain to the northeast.

3.2.4 Transportation

The ROI for the transportation analysis includes the existing principal road, air, and rail networks in the Victor Valley portion of San Bernardino County. The analysis focuses on the segments of the transportation networks in the region that serve as direct or necessary indirect linkages to the base, and those that are commonly used by personnel at George AFB. The area in the immediate vicinity of the base is of special interest.

3.2.4.1 Roadways. Traffic volumes typically are reported as either the daily number of vehicular movements in both directions on a segment of roadway, averaged over a full calendar year (average annual daily traffic, or AADT) or the number of vehicular movements on a road segment during the average peak hour. The average peak-hour volume typically is about 10 percent of the AADT (Transportation Research Board, 1985). These values are useful indicators in

determining the extent to which the roadway segment is used and in assessing the potential for congestion and other problems.

Traffic flow conditions are generally reported in terms of LOS, rating factors that represent the general freedom (or restriction) of movement on roadways (Table 3.2-1). The LOS scale ranges from A to F, with low-volume, high-speed, free-flowing conditions classified as LOS A. LOS E is representative of conditions that, although not favorable from the point of view of the motorist, provide the greatest throughput per hour. With minor interruptions, however, LOS E will deteriorate to LOS F (Transportation Research Board, 1985). As traffic volumes increase or traffic-handling capacities along given roadways decrease, free-flow conditions become restricted and LOS deteriorates. LOS F represents breakdown, stop-and-go conditions. Levels of service generally are evaluated and reported for typical clear-weather conditions.

Table 3.2-1. Road Transportation Levels of Service

		Criteria (Volume/Capacity)		
LOS	Description	4-Lane Freeway	4-Lane Arterial	2-Lane Highway
A	Free flow with users unaffected by presence of others in traffic stream	0-0.35	0-0.28	0-0.10
B	Stable flow, but presence of other users in traffic stream becomes noticeable	0.36-0.54	0.29-0.45	0.11-0.23
C	Stable flow, but operation of single users becomes affected by interactions with others in traffic stream	0.55-0.77	0.46-0.60	0.24-0.39
D	High density, but stable flow; speed and freedom of movement are severely restricted; poor level of comfort and convenience	0.78-0.93	0.61-0.76	0.40-0.57
E	Unstable flow; operating conditions near capacity with reduced speeds, maneuvering difficulty, and extremely poor levels of comfort and convenience	0.94-1.00	0.77-1.00	0.58-0.94
F	Forced or breakdown flow with traffic demand exceeding capacity; unstable stop-and-go traffic	>1.00	>1.00	>0.94

Source: Transportation Research Board, 1985.

Traffic flow conditions usually are most congested during morning and evening peak hours, and depend on the physical characteristics of the roadway, traffic volumes, and the vehicular mix of traffic. A common design goal is to provide peak-hour service at levels no lower than LOS C or D. A typical two-lane rural

highway will have a maximum two-way design capacity of 2,000 to 2,800 passenger vehicles per hour. On such roads, travel is affected substantially by traffic in the opposing lane, and by curves and hills, all of which impair a motorist's ability to pass safely. By contrast, each lane of an interstate highway (divided, with restricted access) will provide a capacity of about 2,000 vehicles per hour under a wide range of conditions. In urban or suburban settings, the capacity of signalized intersections that restrict traffic flow influences LOS more than the capacity of a roadway segment. LOS ratings presented in the remainder of this section are determined by: (1) peak-hour traffic volumes and capacity for key roadways, and (2) intersection volumes and capacities for urban and suburban road segments, as noted.

Existing road and highway conditions are described at three levels: (1) regional, representing the major links within the Victor Valley; (2) local, representing key community roads; and (3) George AFB roads.

Regional. The region surrounding George AFB is served by a network of interstate, U.S., and state highways, and city and county roads (Figure 3.2-1). I-15 provides direct access to Ontario, 45 miles to the south, and to Barstow, 35 miles to the northeast. I-215 connects the base to San Bernardino, about 45 miles to the south, via I-15. From Ontario, I-10 links the region with Los Angeles, about 50 miles west of Ontario, and Palm Springs, about 60 miles to the east. U.S. 395 intersects I-15 about 13 miles south of the base but diverges toward the north, whereas I-15 continues to run in a northeasterly direction. It is proposed to upgrade U.S. 395 to full freeway status, and to relocate it 1 to 3 miles west of its present alignment. Caltrans currently is planning to widen SR 18 (Palmdale Road) into a four-lane expressway with freeway to surface street interchanges at U.S. 395 and I-15. This would become the first major east-west highway through Victor Valley. No dates have been established for construction of the U.S. 395 or SR 18 improvements.

Service levels on regional roads currently are comparatively good (free-flowing) on road segments outside the influence of urban commuting traffic. These conditions are expected to be unchanged at base closure. Intercity traffic in the region is generally unrestricted and the rural sections of the regional-service roads provide acceptable LOS.

As part of the Victor Valley Infrastructure Enhancement Program (traffic/road analysis component) of 1988, the San Bernardino Associated Governments (SANBAG) in conjunction with San Bernardino County identified roadway infrastructure needs in the Victor Valley to the year 2010. A computer-based model used future land use assumptions within the Valley for 1995 and 2010 to estimate vehicular trips. These trips were then distributed throughout the Valley and assigned to the existing road network. The study, which assumed the continued operation of George AFB, recommended the following changes pertinent to the vicinity of the base (San Bernardino County, 1988b):

- U.S. 395, change to freeway status
- Air Base, Emerald (Topaz), El Mirage, and Adelanto roads, change to major arterial divided
- Cobalt Road (across Air Base Road from George AFB Main Gate) and El Evado roads, change to major arterial (not divided).

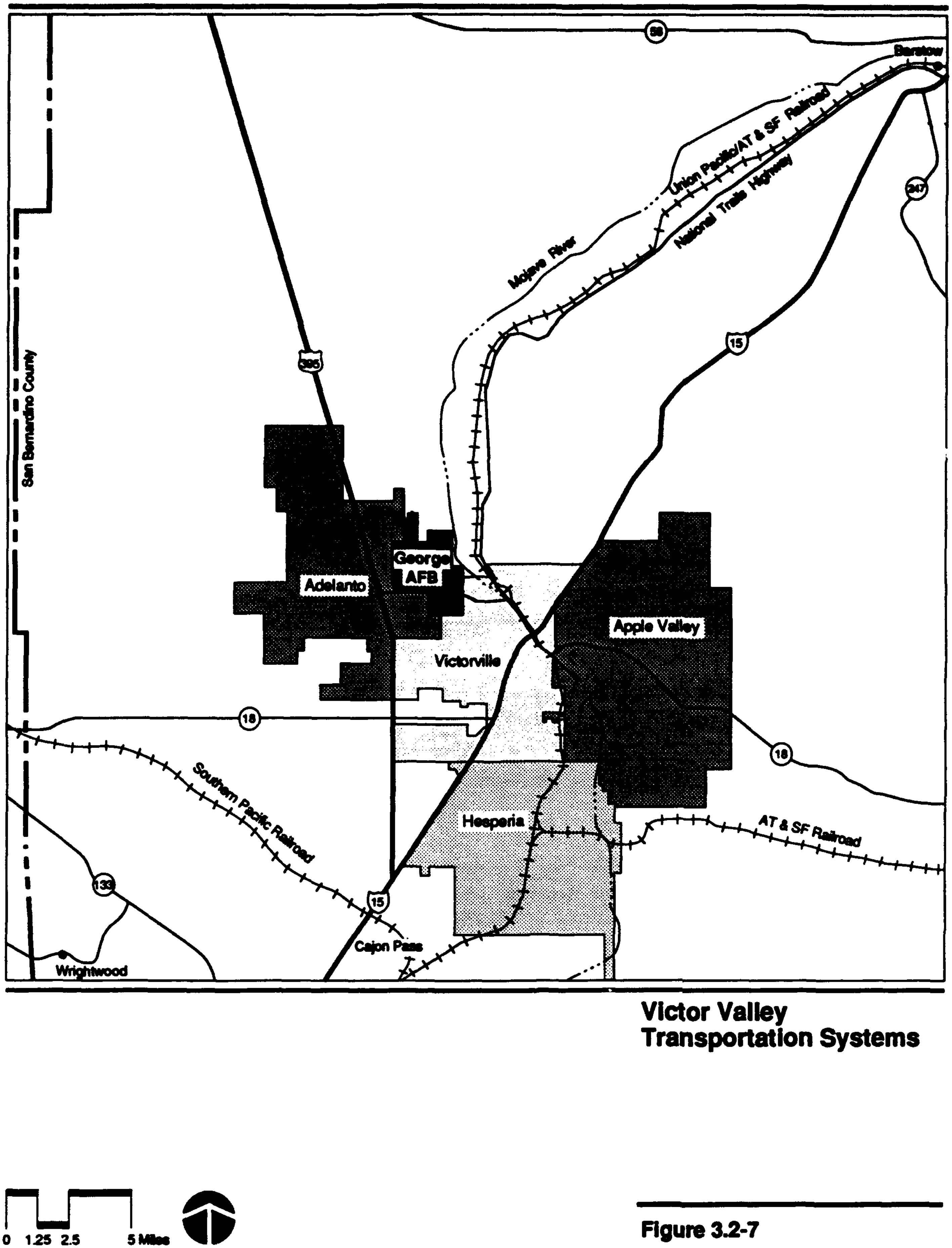
Local. Figures 3.2-7 and 3.2-8 show the general local road network now in place and projected to be in place at the time of base closure in the immediate vicinity of George AFB. Access to George AFB may be gained from either the Main Gate (Phantom Street) or the Housing Gate (Cory Boulevard), both of which open onto the north side of Air Base Road and are about 1 mile apart (Figure 3.2-9). Air Base Road is a two-lane, east-west, collector road that extends from National Trails Highway, about 3 miles east of the Main Gate, to U.S. 395, about 2 miles west of that gate.

National Trails Highway (old U.S. 66) is a two-lane, north-south collector road that becomes SR 18 after it crosses under I-15, and leads into the city of Apple Valley. The most important road leading into the city of Victorville from the base is Village Drive, a four-lane, north-south arterial. Adelanto Road is a major north-south street in the city of Adelanto, and starts where U.S. 395 diverges to the northwest, about 2 miles south of Air Base Road. Adelanto Road adjoins a portion of the western boundary of George AFB.

Under the various base reuse alternatives analyzed in Chapter 4 of this study, five other roadways will become important to provide access to the base area:

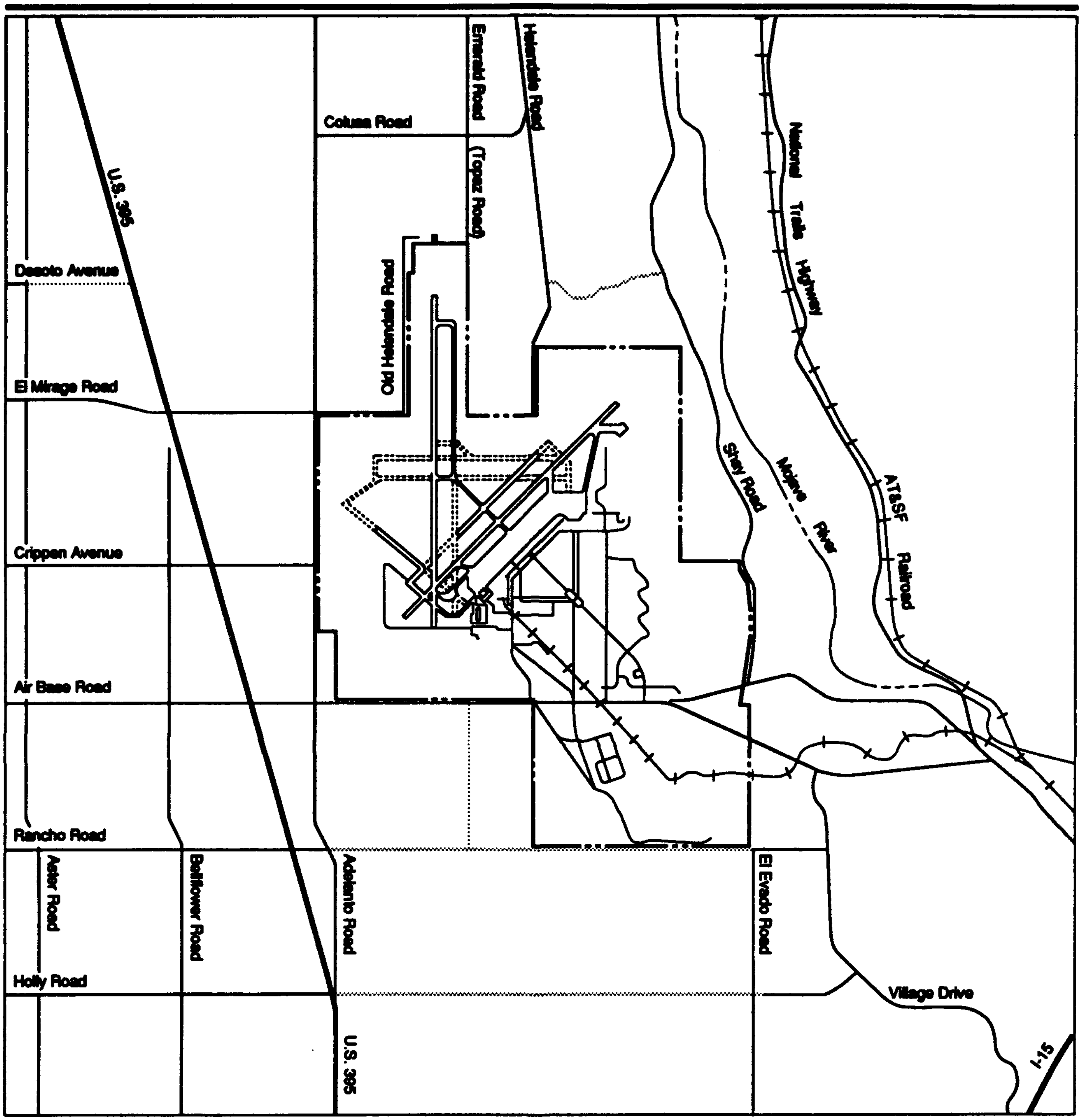
- Helendale Road is in the unincorporated portion of San Bernardino County and extends north toward the community of Helendale from near the north base boundary.
- Crippen Road is an east-west roadway in Adelanto that crosses U.S. 395 1 mile north of Air Base Road and extends to the west base boundary.
- Colusa Road is an unincorporated area east-west road that runs between Adelanto Road and Helendale Road, about 4 miles north of Air Base Road.
- El Mirage Road is also an east-west road in Adelanto that presently extends west from U.S. 395, but is proposed to extend east to the west base boundary.
- Shay Road is an unincorporated area north-south road that extends north from Turner Road about 0.6 mile east of Air Base Road, along the east base boundary.

All five of these roads are presently relatively minor two-lane roadways for which no traffic data have been collected. The Victorville General Plan proposes that Air Base Road and National Trails Highway, north of Rancho Road, be improved to four-lane arterial highways with 84-foot rights-of-way. That plan also proposes that El Evado Road south of Rancho Road be improved to parkway status with four lanes, divided, and with a 100-foot right-of-way. It also proposes to improve Amethyst/Cobalt Road to parkway status south from Air Base Road (City of Victorville, 1990).



Victor Valley Transportation Systems

Figure 3.2-7



EXPLANATION

Base Boundary

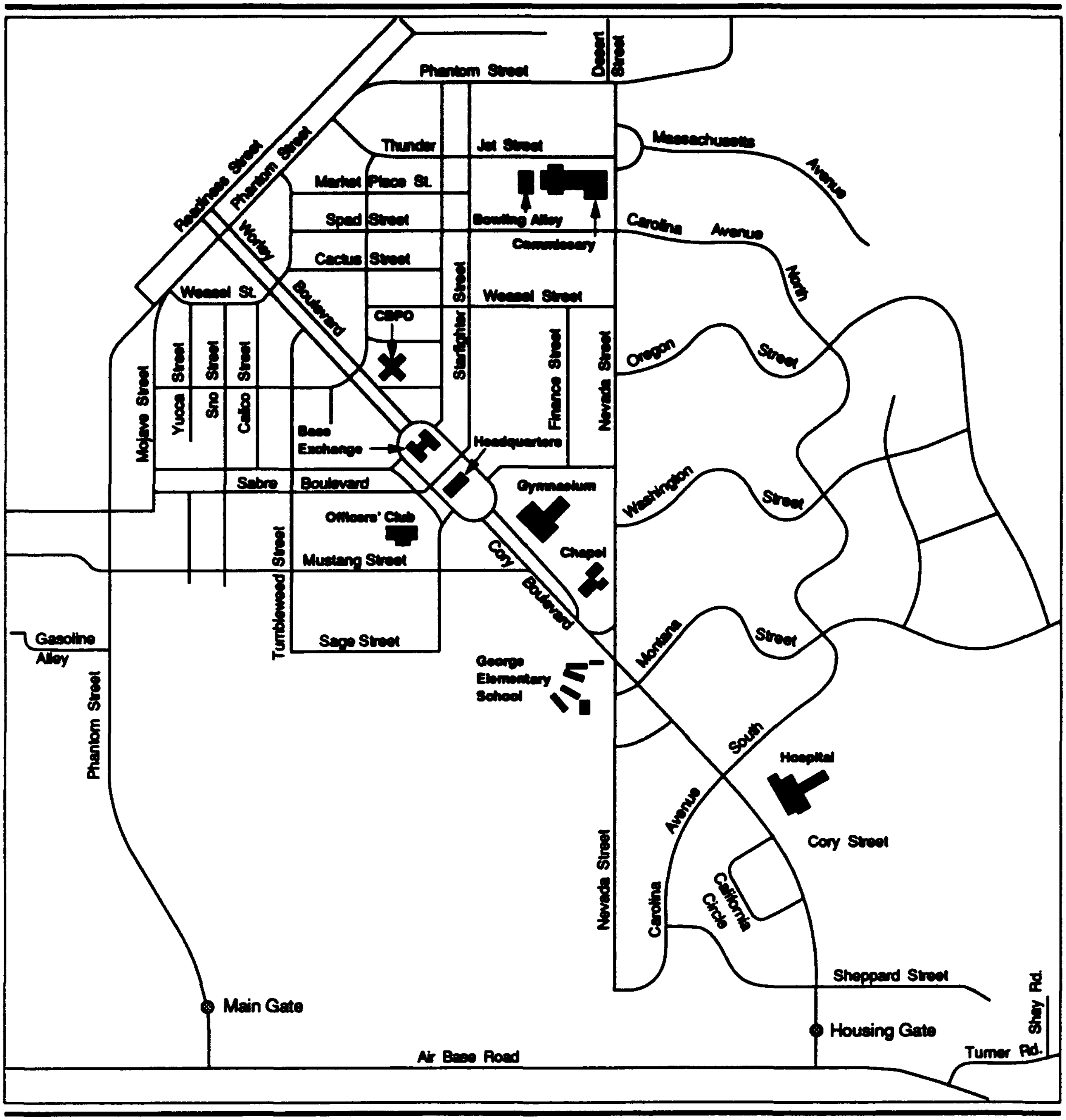
Dirt Road

Abandoned Runway

0 1/4 1/2 1 Mile

George AFB Vicinity: Major Streets

Figure 3.2-8



George AFB On-Base Roads

Figure 3.2-9

Preclosure Reference. Preclosure (1990) peak-hour traffic volumes, capacities, and LOS on key community roadways are shown in Figure 3.2-10. The three roadways shown on that figure and the five local roadways listed above are identified for this study as key community roads because they would provide the most direct access to the George AFB area upon reuse. The current key community roads are:

- Air Base Road East (Housing Gate to Village Drive)
- Air Base Road West (Main Gate to U.S. 395)
- U.S. 395 (Air Base Road to El Mirage Road)
- Village Drive (Air Base Road to Mojave Drive).

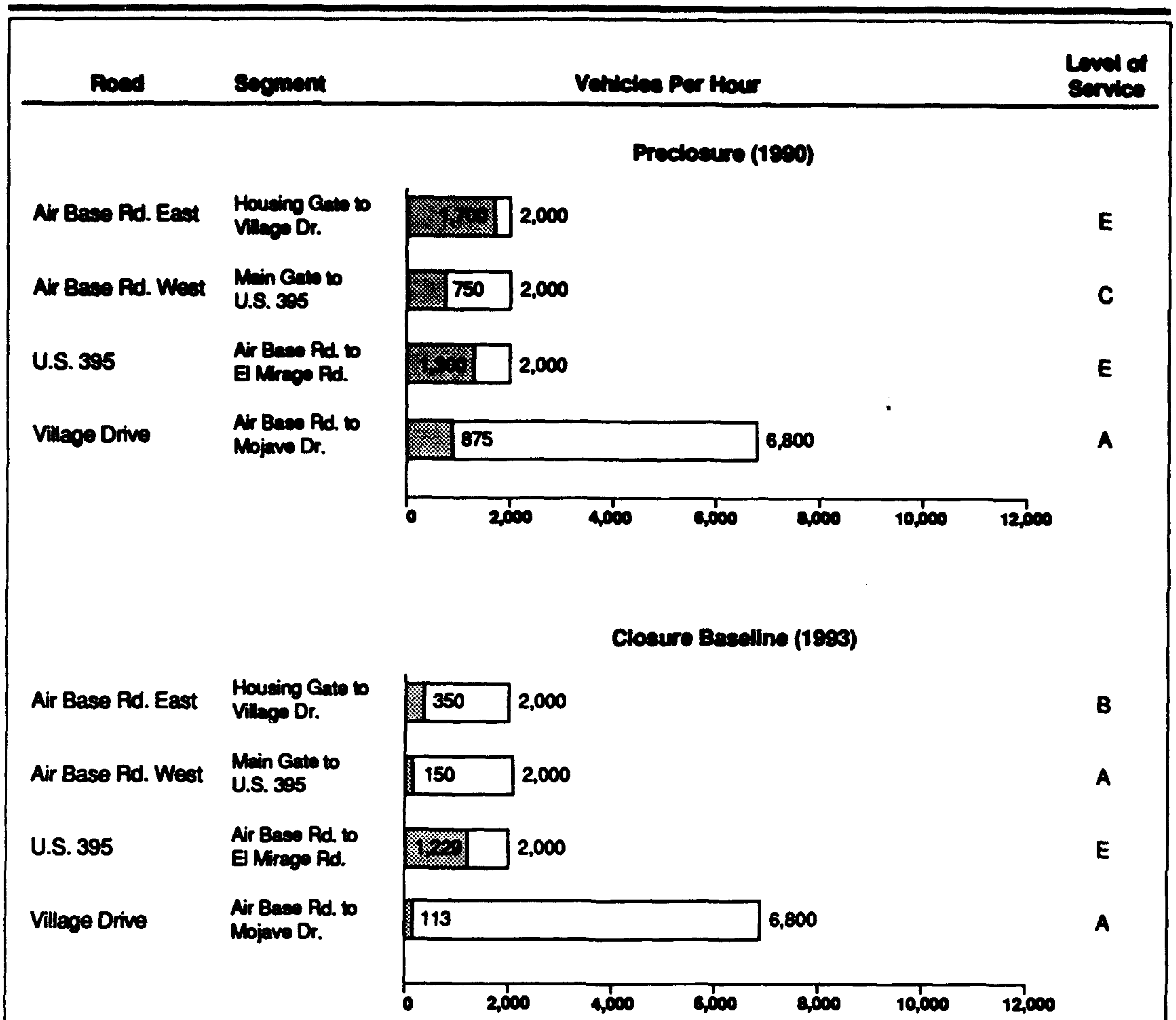
The key community road currently experiencing the most critical problem is Air Base Road East, where the peak-hour traffic is about 1,700 and the peak-hour LOS is E. The high volume is the result of base traffic going to and from the Victorville area via Village Drive. The other key community roadway with LOS E is U.S. 395 between Air Base Road and El Mirage Road, where the peak-hour traffic volume is about 1,300. Air Base Road West has an LOS of C (approaching D), with about 750 peak-hour vehicles. Village Drive has an LOS of A, and a peak-hour volume of about 875. I-15 is also operating at a peak-hour LOS of C, with a peak hour volume of about 5,600 (Victor Valley Economic Development Authority, 1990b).

Recently, an additional lane was constructed on Air Base Road at the Main Gate. The current LOSs on the three most important intersections on Air Base Road are listed below (Victor Valley Economic Development Authority, 1990b).

	LOS	
Intersection	**a.m.**	**p.m.**
Main Gate at Air Base Road	A	A
Housing Gate at Air Base Road	A	E
Village Drive at Air Base Road	A	B

Conditions of other pertinent intersections in the area are as follows (Victor Valley Economic Development Authority, 1990b):

• Air Base Road at Adelanto Road	Four-way stop; long lines of traffic in both directions on Air Base Road
• Air Base Road at National Trails Highway	T-intersection; stop for Air Base Road, but free right turn; inadequate merge area
• U.S. 395 at Air Base Road	Flashing red at intersection; long queues on north, south, and westbound legs.



Note: 1993 Peak-Hour Volumes are based upon 1990 levels and increased consistently with projected population growth, less base generated traffic.

Sources: VVEDA, 1990; Transportation Research Board, 1985.

EXPLANATION

Peak-Hour Traffic Volume (passenger cars per hour)

Peak-Hour Traffic Capacity (passenger cars per hour)

Peak-Hour Traffic Volumes on Key Community Roads

Figure 3.2-10

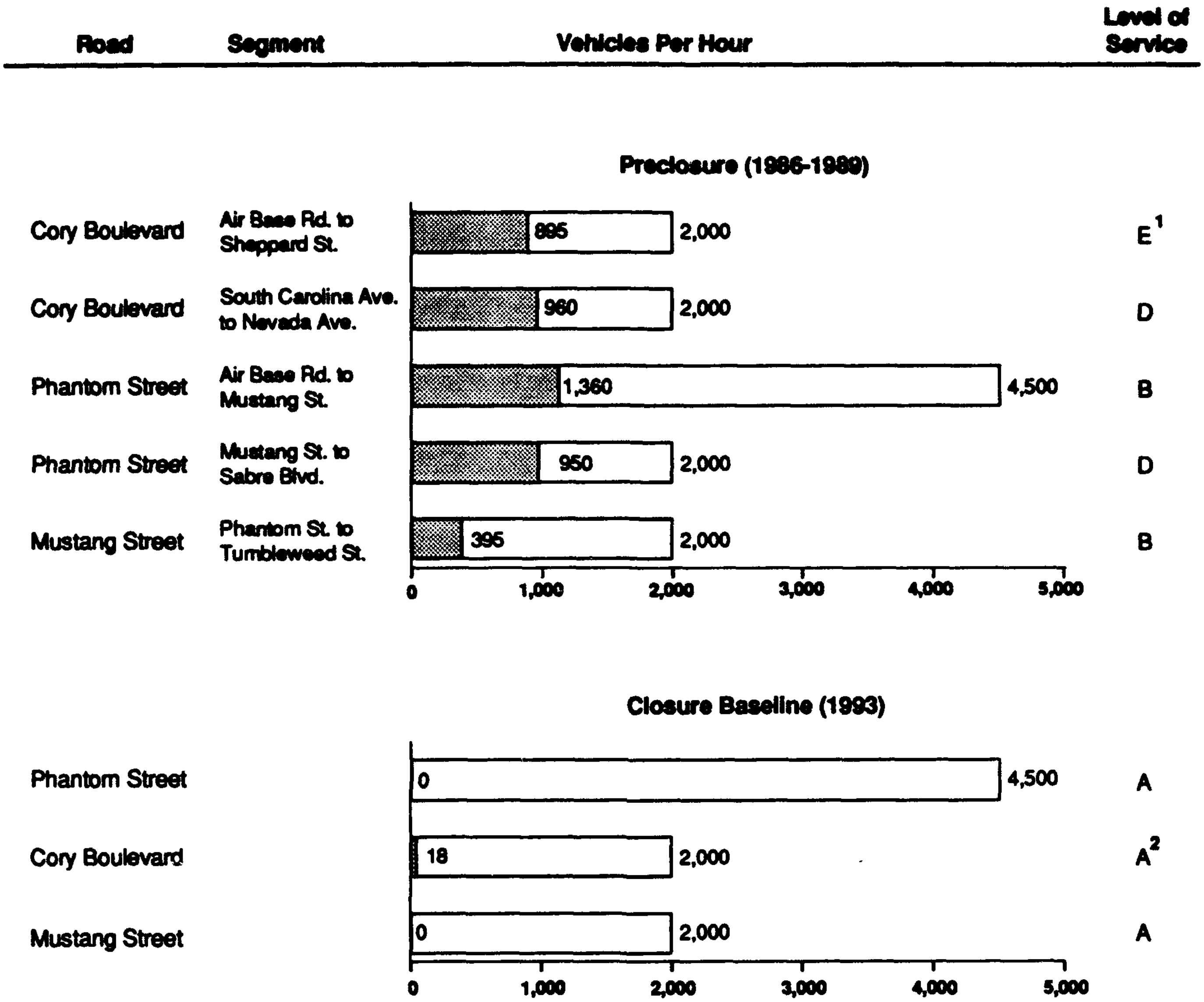
Access to the base currently is gained through the Main Gate and the Housing Gate, both of which open onto Air Base Drive. The Main Gate is open 24 hours a day, while the Housing Gate is subject to scheduled closures. The base contains 53 miles of paved roadways, mostly laid out in a north-south, east-west grid pattern that is cut diagonally by Cory-Worley boulevards (see Figure 3.2-9). The three on-base roads that receive the heaviest traffic are Cory Boulevard, Phantom Street, and Mustang Street. These roadways are designated as the key on-base roads for the purposes of this study. All are two-lane roads except for Phantom Street, which has four lanes between the Main Gate and POL Access Road (about 0.5 mile). Figure 3.2-11 shows the peak-hour volume, peak-hour capacity, and LOS of each of the key on-base roads in 1987, including two locations on Cory Boulevard and Phantom Street.

The southerly portion of Phantom Street has a peak-hour volume of about 1,360 and operates at LOS B (approaching C). Between Mustang Street and Sabre Boulevard, Phantom Street operates at LOS D because it is only a two-lane road. Cory Boulevard extends north and then curves northwest from the Housing Gate and Air Base Road. Between South Carolina Avenue and Nevada Avenue, Cory Boulevard has a peak-hour volume of about 960, and operates at LOS D. Between the Housing Gate off Air Base Road and Sheppard Street, Cory Boulevard operates at LOS E because of intersection delays at the gate. Mustang Street is the main east-west street between Cory Boulevard and Phantom Street. It has a peak-hour volume of 395 vehicles and operates at LOS B (Military Traffic Management Command Transportation Engineering Agency, 1987).

Closure Baseline. Traffic on the key roads will increase in proportion to the area's population minus the traffic generated by the base by the 1993 closure baseline. Figure 3.2-10 shows the projected peak hour traffic on the key community roads. U.S. 395 will continue to have peak hour congestion problems, operating at LOS E as in 1990. Without base traffic, however, Air Base Road is projected to experience relatively free flow (LOS A and B). Community growth is projected to be strong enough that loss of base-generated traffic would have little effect on community peak-hour traffic at the time of base closure.

After closure of George AFB, traffic generated by the base will no longer use these streets, except as required by a 50-person DMT using Cory Boulevard as the only access. The LOS for all on-base roads will then be A (see Figure 3.2-11).

3.2.4.2 Airspace. Airspace is a finite resource that can be defined vertically and horizontally, as well as temporally, when describing its use for aviation purposes. As such, it must be managed and utilized in a manner that best serves the competing needs of commercial, general, and military aviation interests. The FAA is responsible for the overall management of airspace and



1 Although this segment of Cory Boulevard could operate at Level of Service D, because of intersection delays at Air Base Road, it actually operates at Level of Service E.
2 Upon closure, Cory Boulevard will be the main on-base road serving 50 maintenance workers.

Source: MTMCTEA, 1987.

EXPLANATION

Peak-Hour Traffic Volume (passenger cars per hour)

Peak-Hour Traffic Capacity (passenger cars per hour)

Peak-Hour Traffic Volumes on Key On-Base Roads

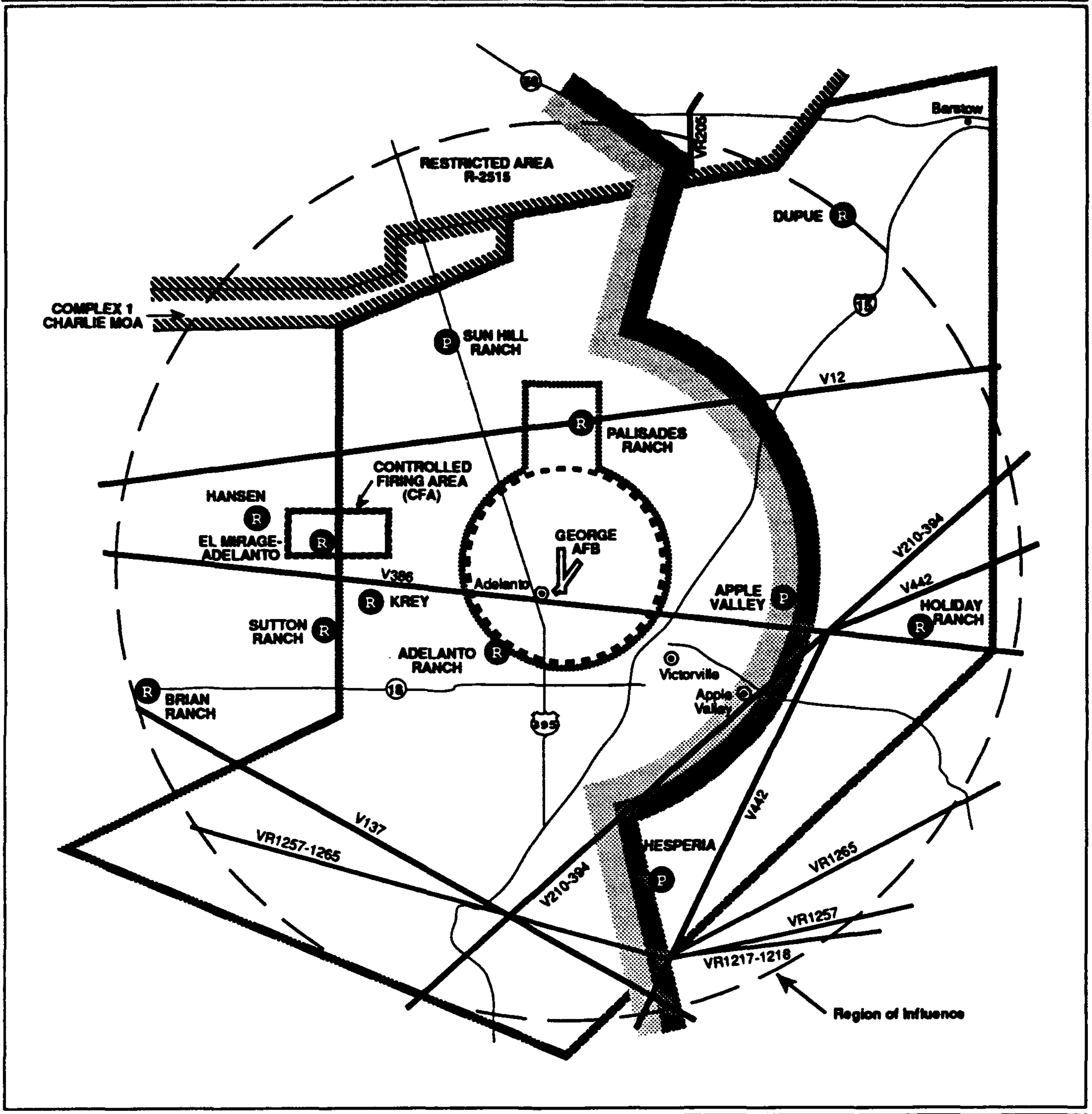
Figure 3.2-11

has established different airspace designations that are designed to protect aircraft while operating to or from an airport, transiting enroute between airports, or operating within "special use" areas identified for defense-related purposes. Each type of airspace is defined in the Glossary of Terms and Acronyms/Abbreviations, Appendix A. Rules of flight and ATC procedures have been established which govern how aircraft must operate within each type of designated airspace. All aircraft operate under either instrument or visual flight rules (IFR or VFR). IFR aircraft (primarily commercial and military aviation) operate within controlled airspace and are tracked and separated by the ATC system. VFR aircraft (primarily general aviation) are not normally tracked by ATC but rather fly under a see and be seen concept in which pilots are responsible for their own separation from other air traffic. Airspace around the busier airports is more stringently controlled and may require that all aircraft (including VFR) be in contact with and monitored by an ATC agency while transiting through the area.

A given geographical region may encompass several different types of airspace that apply not only to normal IFR and VFR aircraft operations, but to military flight training operations as well. Military operations areas (MOAs) and restricted areas are the most common types of airspace that have been designated for defense-related activities. MOAs contain nonhazardous air intercept flight training operations which do not restrict transit of other air traffic. Restricted areas, however, normally contain aerial gunnery or air-to-ground bombing activities and transit through these areas by any non-participating aircraft is generally limited while such hazardous activities are taking place.

The type and dimension of individual airspace areas established within a given region and their spatial and procedural relationship to each other is contingent upon the different aviation activities conducted in that region. When any significant change is planned for this region, such as airport expansion, a new military flight mission, etc., the FAA will reassess the airspace configuration to determine if such changes will adversely affect (1) air traffic control systems and/or facilities; (2) movement of other air traffic in the area; or (3) airspace already designated and used for other purposes (i.e., MOAs or restricted areas). Therefore, considering the limited availability of airspace for air traffic purposes, the given region may or may not be able to accommodate any significant airport or airspace area expansion plans.

Airspace ROI. The ROI selected for this study is an area within a 20 nm radius of George AFB from the surface up to 13,000 feet MSL, which represents a three-dimensional volume of airspace normally required to support IFR air traffic operations at a typical military or civil regional airport (Figure 3.2-12). Airport expansion resulting from international growth could require additional supporting airspace beyond the dimensions of this ROI. The ROI encompasses the different airspace areas that were associated with preclosure operations at George AFB as well as portions of the DOD R-2508 Complex, which is an



EXPLANATION

P Public Use Airport

R Restricted/Private Use Airport

George AFB Ground Control Approach Radar Traffic Area

George AFB Control Zone

George AFB Airport Traffic Area

Federal Airways

Transition Area (Floor at 700' AGL)

Transition Area (Floor at 1200' AGL)

Special Use Airspace Areas

Military Training Routes

0 2.5 5 10 Nautical Miles

Airspace Region of Influence (20 nm Radius of George AFB)

Figure 3.2-12

expanse of airspace utilized for defense-related missions. Restricted Area R-2515 and the Complex (Charlie MOA) is in the southern portion of the R-2508 Complex and within the ROI. Airspace within and immediately surrounding this ROI is under the jurisdiction of the Edwards FAA Radar Approach Control (RAPCON) which is operated by the FAA and primarily responsible for ATC radar services at George AFB, Edwards AFB, China Lake Naval Weapons Center, and Palmdale (AF Plant 42). Aircraft operations within this ROI do not normally conflict with air traffic flows at the other airfields or the Norton AFB and Ontario Airport area due to the manner in which ATC airspace and procedures have been segregated for the respective locations. Airspace above 13,000 feet MSL is controlled by the Los Angeles Air Route Traffic Control Center (ARTCC) and is not significantly affected by operations within the ROI. However, significant growth at one or more of the major airfields in the region could lead to potential airspace conflicts between the respective airport traffic flows and added congestion in the ARTCC's airspace.

Preclosure Reference. An understanding of the ROI airspace environment and its use under the preclosure reference is necessary to help determine its capability and capacity to accommodate future aviation activities. The same constraints and considerations such as terrain, runway alignments, and other air traffic flows would apply under alternate aviation uses of George AFB.

Airspace designated for ATC purposes around George AFB consists of the Ground Controlled Approach (GCA) radar traffic area, transition areas established in conjunction with George AFB instrument approach procedures or overlying federal airways, a control zone, and an airport traffic area (ATA). (Explanations of transition areas, control zones, and airport traffic areas are contained in the Glossary of Terms and Acronyms/Abbreviations, Appendix A.) In addition to these designated ATC airspace areas, five federal, low-altitude, enroute airways transit the area containing George AFB terminal operations. Figure 3.2-12 depicts each of these designated ATC airspace areas and the five federal airways.

The George AFB GCA radar traffic area is airspace that is sub-delegated to the base by the Edwards FAA RAPCON for the control of local IFR traffic. Using an Air Force surveillance radar system located on the base, the GCA is responsible for providing ATC services within the lateral limits of this airspace below 7,000 MSL to arriving and departing aircraft, as well as to those remaining within the radar traffic pattern for successive practice approaches to the airfield. This ATC facility also provides traffic advisories to other aircraft transiting through this airspace. After normal operating hours at George AFB, this airspace reverts back to the Edwards FAA RAPCON, which is then responsible for IFR operations within this area. When the Edwards FAA RAPCON is closed, this airspace is then under the control of the FAA's Los Angeles ARTCC. Radar systems utilized by the Edwards FAA RAPCON and Los Angeles ARTCC cannot presently provide radar coverage below 4,500 feet MSL within the George AFB

vicinity because of terrain and the remote locations of their various radar sites. Therefore, IFR aircraft arriving at and departing from George AFB below 4,500 feet must be separated through the use of conventional nonradar ATC procedures when the GCA is not in operation; however, very few flight operations occur at George AFB during those hours.

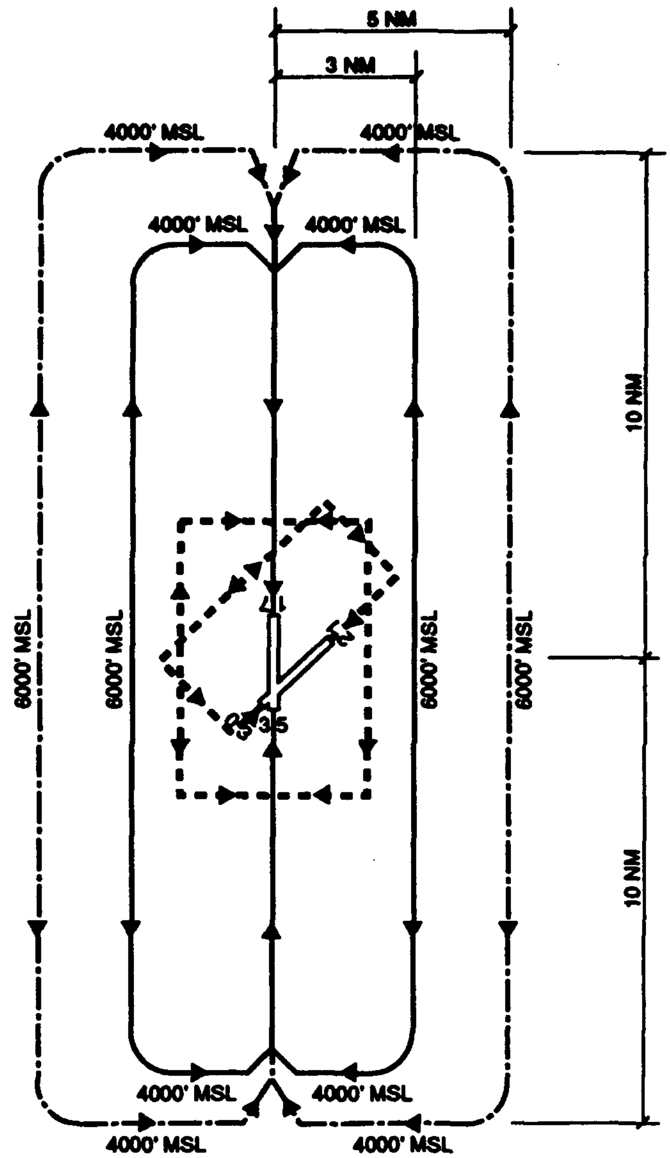
The traffic patterns, instrument approaches, and departure procedures used at George AFB under preclosure conditions basically represent the airspace requirements for IFR aircraft operating at the base and transitioning between the base and the enroute airspace system (airways or other transit routes) or the R-2508 complex. Table 3.2-2 identifies the type and number of aircraft operations that were conducted at George AFB in calendar year (CY) 1990. The orderly flow of the base IFR aircraft is predicated on the use of these instrument procedures and traffic patterns or other directions from ATC to maintain proper sequencing and separation. VFR aircraft normally fly in a more direct route to and from the base; the pilots of these aircraft are responsible for maintaining visual separation between aircraft.

Table 3.2-2. George AFB Aircraft Operations*, 1990

	Aircraft Operations			
Assignment	Type	Day	Night	Total
Aircraft Based at George AFB	F4E/G	19,915	1,958	21,873
Aircraft Based at George AFB	OV-10	3,485	350	3,835
Transient	A-7	119	0	119
Transient	A-10	187	0	187
Transient	OA-37	180	0	180
Transient	T-38	4,737	0	4,737
Transient	F-4	7,770	0	7,770
Transient	OV-10	121	0	121
Transient	F-15	4,755	0	4,755
Transient	F-16	4,490	0	4,490
Transient	C-130	260	0	260
Transient	C-141	277	0	277
Transient	A-4	232	0	232
Transient	A-6	257	0	257
Transient	F-14	184	0	184
Totals		46,969	2,308	49,277

*An aircraft operation is one takeoff or one landing.
Source: George AFB.

Figure 3.2-13 delineates George AFB's airport traffic patterns as they apply to VFR (tower-controlled) as well as radar-directed (GCA-controlled) operations. Jet aircraft using VFR traffic patterns are not permitted to fly multiple rectangular patterns to Runway 21 (landing/departing to the southwest), in order to reduce



EXPLANATION

— — — F-4 Radar Traffic Pattern

——— Radar Traffic Pattern-All Other Aircraft

▪▪▪▪▪ VFR Traffic Pattern

0 2.5 5 10 Nautical Miles

Aircraft Traffic Patterns

Figure 3.2-13

noise effects on the city of Adelanto. Successive rectangular patterns to Runway 03 (landing/departing to the northeast) are conducted only when necessitated by mission requirements, because of the strong crosswind conditions that can result from the Santa Ana winds in the area.

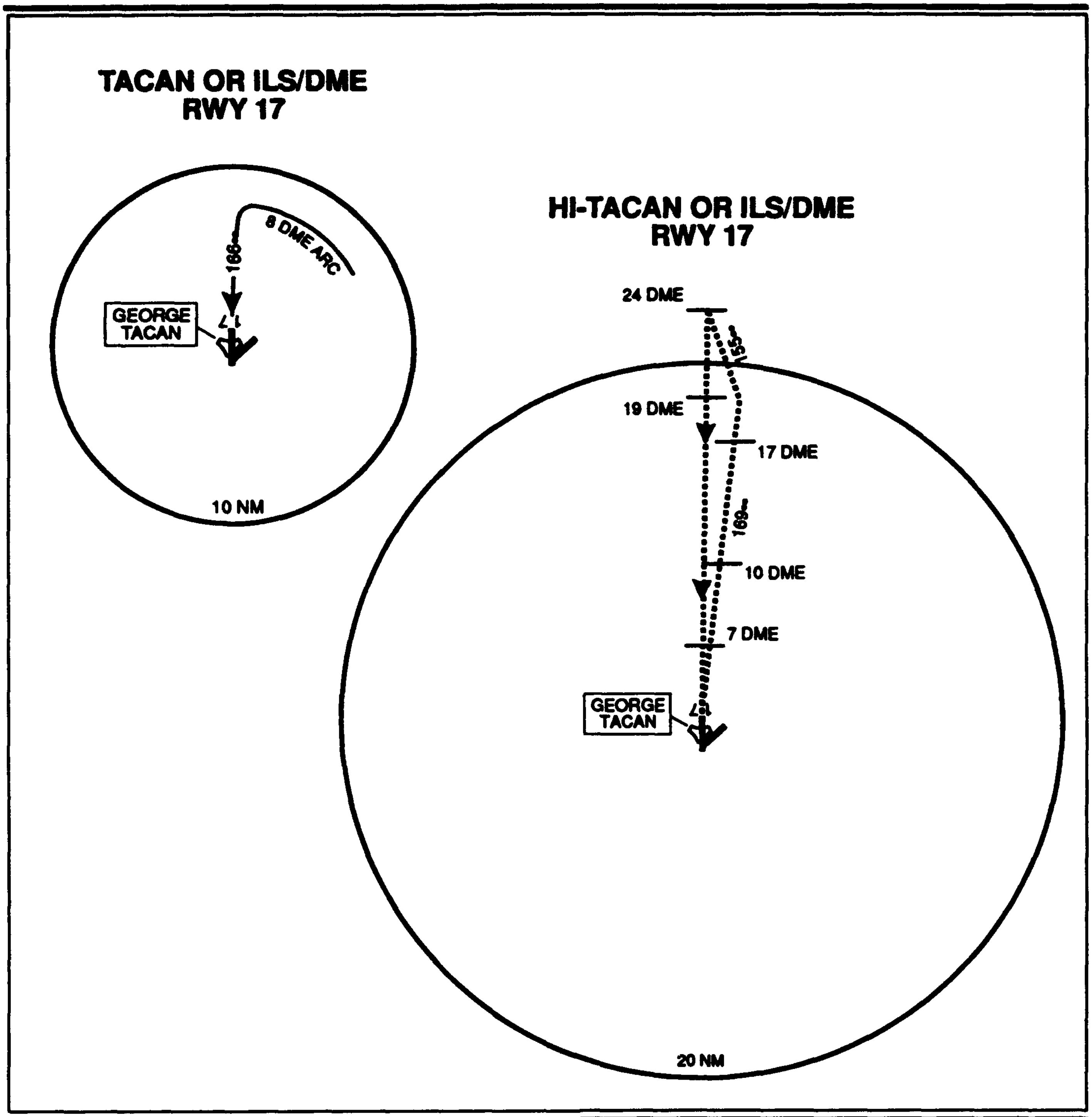
The radar traffic patterns are used by the GCA to route aircraft under its control for landings on the north/south oriented Runway 17/35, the primary runway for the base. The radar traffic patterns are used for arriving IFR aircraft, as well as for aircraft flight training involving successive practice approaches to Runway 17/35. There are no radar traffic patterns to Runway 03/21; instrument approach procedures are not established for this runway because of terrain, prevailing winds, and noise considerations.

The airspace utilized for the flight tracks flown by military aircraft using the instrument approach procedures to Runways 17 and 35 is shown in Figures 3.2-14 and 3.2-15, respectively. The procedures are based on directional guidance and distance provided by a tactical air navigation (TACAN) and an instrument landing system/distance measuring equipment (ILS/DME) located on the airfield. The standard procedures (identified as TACAN or ILS/DME) are contained within a 10-nm radius of George AFB and are primarily used by air transport-type aircraft. The "high altitude" approaches (identified as HI-TACAN) are initiated within AFFTC airspace 24 nm north of George AFB and are used primarily by fighter-type aircraft returning to the base after operating in the AFFTC special use airspace complex.

Figure 3.2-16 illustrates the two published, standard-instrument departure procedures used prior to closure of George AFB. These procedures channel aircraft from the base and into the enroute airspace structure. Essentially, one route (identified as the "Peace" departure) is for traffic westbound from George AFB, and the other route (identified as the "Orddy" departure) is for eastbound traffic. These procedures are used for takeoffs from three of the four runways.

Instrument departures are not conducted from Runway 03 due to terrain, wind, and noise considerations.

Defense-related airspace within the ROI includes a portion of R-2515, the Complex 1 Charlie MOA, a Controlled Firing Area (CFA) and five military training routes (MTRs) as shown in Figure 3.2-12. R-2515 and the Charlie MOA are part of the R-2508 Complex, which consists of several different restricted areas and MOAs used extensively by Edwards AFB, China Lake Naval Weapons Center, and Fort Irwin for various test and training activities. Although George AFB aircraft were one of the principle users of this complex, other DOD requirements have filled any scheduling vacancies resulting from the base closure.



EXPLANATION

DME - Distance Measuring Equipment

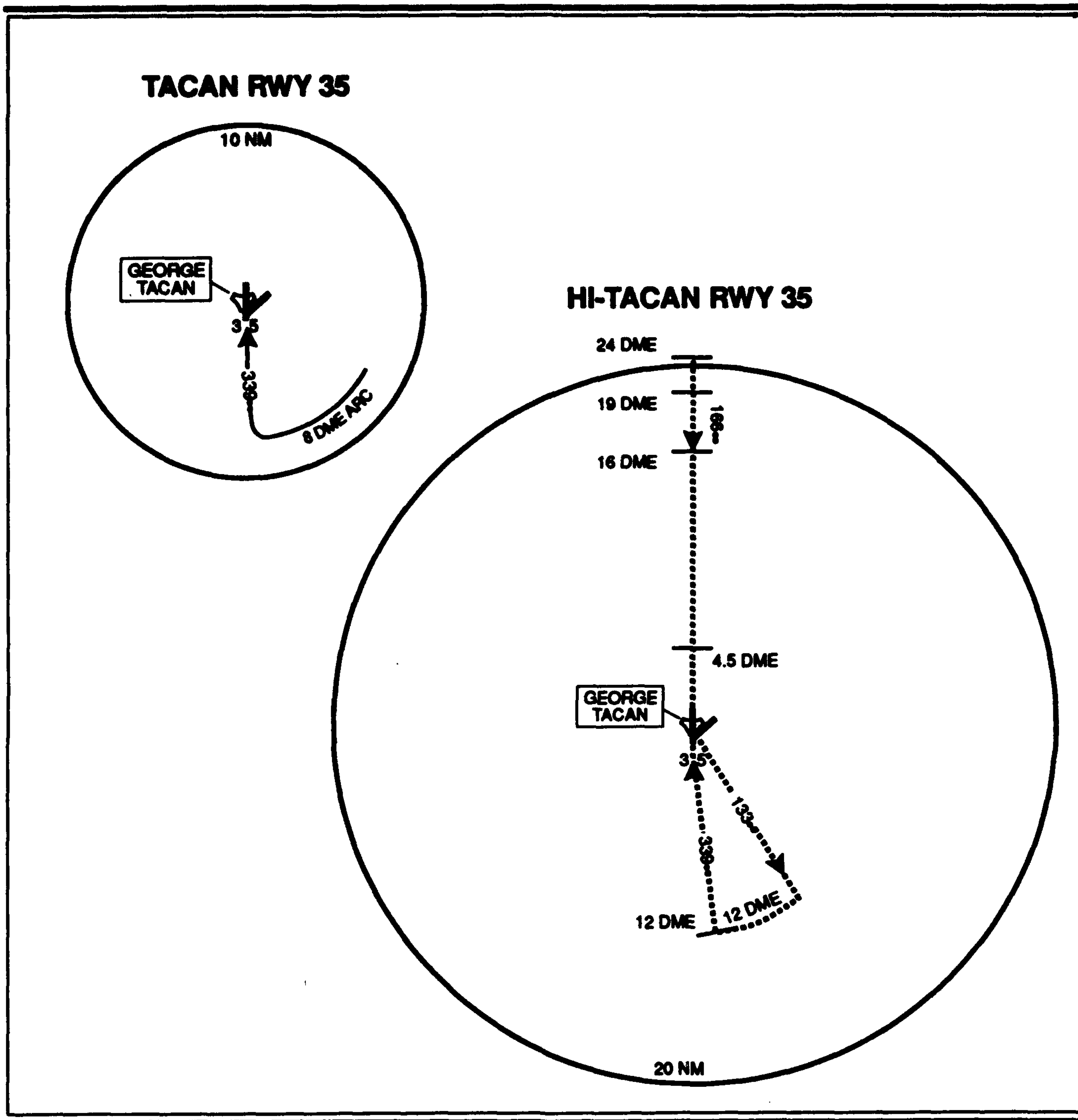
ILS - Instrument Landing System

TACAN - Tactical Air Navigation

0 2.5 5 10 Nautical Miles

Instrument Approach Runway 17

Figure 3.2-14



EXPLANATION

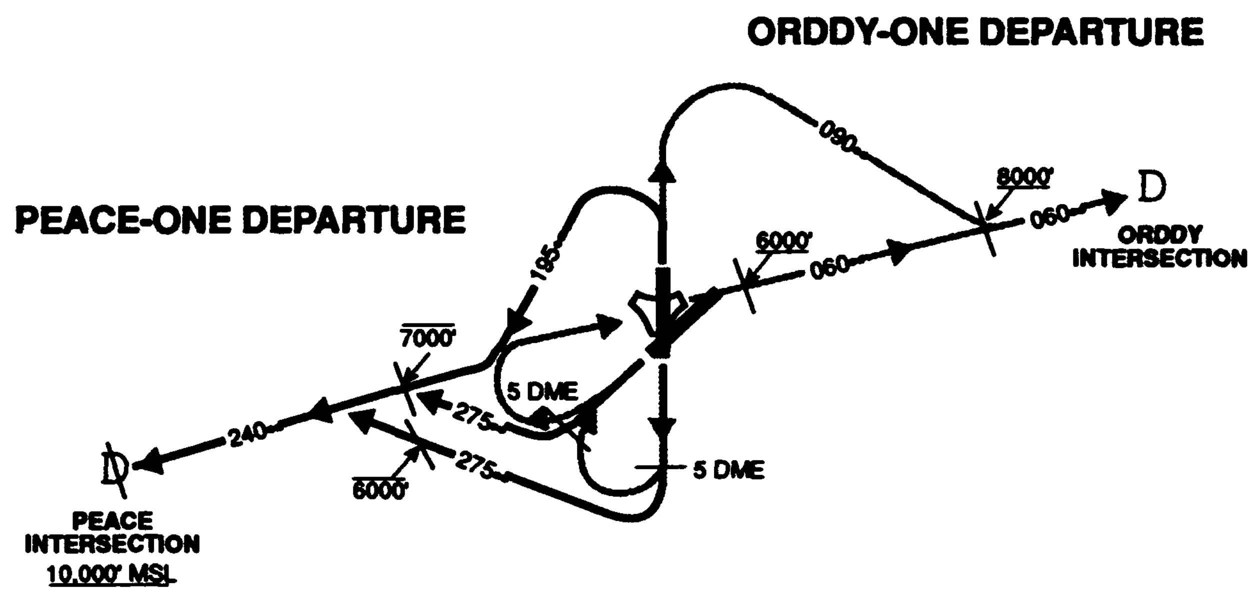
DME - Distance Measuring Equipment

TACAN - Tactical Air Navigation

Instrument Approach Runway 35

0 2.5 5 10 Nautical Miles

Figure 3.2-15



EXPLANATION

DME - Distance Measuring Equipment

Standard Instrument Departure

Figure 3.2-16

R-2515 is located 16 nm north of the base. Mission activities within R-2515 include extensive test and test support activities at all altitudes, air-to-ground gunnery and precision bombing tests within designated ranges, and air refueling. The number of sorties conducted in R-2515 in 1990 is shown in Table 3.2-3. The southernmost portion of R-2515 contains a 4 nm-wide, east-west corridor (Alpha Corridor) designated for supersonic flights below 30,000 feet. The eastern end of this corridor is approximately 16 nm north of George AFB. Aircraft utilization data for the Alpha Corridor are not available. Other activity includes numerous helicopters and pipeline or powerline patrol aircraft below 1,000 feet above ground level (AGL) along California Highway 58.

Table 3.2-3. Restricted Area Altitudes and CY 1990 Aircraft Sorties

Restricted Area	Base Altitude (ft)	Ceiling Altitude (ft)	Number of Sorties
R-2502N	Surface	Unlimited	5,203
R-2509	Surface	Unlimited	6,182
R-2515	Surface	Unlimited	35,226

Sources: U.S. Air Force, George AFB; U.S. Air Force, Edwards AFB.

The Complex 1 Charlie MOA extends from 200 feet AGL up to, but not including, 18,000 feet MSL, with an overlying air traffic control assigned airspace (ATCAA) extending up to 60,000 feet MSL, noted as flight level (FL) 600. This MOA and its overlying ATCAA are approximately 14 nm north of the base, and provide additional airspace for aircraft transition within the R-2508 range complex. Approximately 24,650 aircraft sorties were conducted through this MOA in 1990.

The five MTRs that transit the George AFB ROI (Figure 3.2-12) are all VFR routes (VRs). George AFB is the scheduling agency for VR-1217 and VR-1218. The remaining three routes are scheduled by other military groups in the region. Table 3.2-4 delineates these MTRs, the operating altitudes for those MTR segments that transit the George ROI, and the number of operations that were conducted on each MTR in 1990.

Table 3.2-4. Military Training Route Altitudes and 1990 Aircraft Operations

MTR	Base Altitude (ft)	Ceiling Altitude (ft)	Number of Operations
VR-1205	200 AGL	1,500 AGL	161
VR-1217	1,000 AGL	1,500 AGL	2,855
VR-1218	1,000 AGL	1,500 AGL	1,047
VR-1257	1,000 AGL	1,500 AGL	1,036
VR-1265	200 AGL	1,500 AGL	250

Sources: U.S. Air Force, George AFB; U.S. Air Force, Edwards AFB.

A CFA is located 9 nm west of George AFB, in conjunction with the El Mirage Adelanto private airfield, and is used by a defense contractor for testing remotely piloted vehicles. This testing is conducted periodically between the surface and 5,000 feet MSL under stringently controlled conditions. Restricted areas R-2502N (approximately 45 nm northeast of George AFB) and R-2509 (approximately 42 nm north/northeast of George AFB) are outside the ROI; however, George AFB currently has scheduling responsibility for these areas. R-2502N is utilized for air-to-air and air-to-ground bombing and gunnery training and overlies the Leach Lake tactical weapons range. R-2509 overlies the Superior Valley weapons range and is used for air-to-ground bombing and gunnery training. Table 3.2-3 delineates the operating altitudes associated with these two restricted areas and the number of sorties conducted in each area in 1990.

There are 12 civil airports located within the George AFB ROI (Figure 3.2-12). However, only the Apple Valley Airport, Hesperia Air Lodge, and Sun Hill Ranch are public airports. The remaining nine airports are private airfields. Aircraft operations at these airports are conducted only in visual weather conditions. There are no published instrument approach procedures, ATC facilities, or navigational aids available at any of these civil airports. Aircraft operating at these airports are generally unaffected by flight operations at George AFB, as they will either stay clear of the control zone or contact the tower for traffic advisories while traveling through it. Palisades Ranch, located north of the base and within the control zone, has very limited airfield operations which do not interfere with base air traffic. The current and projected annual operations for each of the three public-use airports are shown in Table 3.2-5. There are no operational data available for the private-use airports.

Table 3.2-5. Existing and Closure Baseline Projected Annual Aircraft Operations for Civil Public-Use Airports in the Vicinity of George AFB

	Annual Operations	
Airport	1990	1992
Apple Valley	71,000	77,000
Hesperia Air Lodge	40,000	45,000
Sun Hill Ranch	200	240

Source: Managers/Operators of Apple Valley, Hesperia Air Lodge, and Sun Hill Ranch Airports.

Closure Baseline. Upon base closure and the termination of flight operations at George AFB, all designated ATC airspace areas and published instrument procedures would be canceled and the area would remain under the general control of the Edwards FAA RAPCON. The surveillance radar system, control tower, and navigational aids (TACAN and ILS) would be removed from service, pending any reuse requirements for these facilities. It is not likely that the airspace would be readily used by the Edwards FAA RAPCON for new IFR transit routes to other airports in the area. VFR aircraft operating from the public

and private airports in the area could transit freely through the airspace surrounding the closed airfield without any tower communications requirements or concerns with base military aircraft operations. Other military aircraft would continue to operate on the MTRs transiting the ROI. Air traffic on the federal airways transiting the ROI would no longer be affected by military aircraft climbing/descending between the base and the R-2508 complex.

Restricted area R-2515 and Charlie MOA, as well as R-2502N and R-2509 are an integral part of the R-2508 airspace complex and will continue to support ongoing DOD and contractor test and training missions. These areas will not be affected by the base closure loss of the George AFB flying mission since this airspace is scheduled to remain near full capacity by other military units. The MTRs transiting the ROI should also be unaffected since these routes were not established solely for George AFB aircraft. Scheduling responsibility for the ten MTRs controlled by George AFB would likely be transferred to other DOD installations currently using or expected to use the airspace. If no DOD user can be identified, the airspace could be returned to the National Airspace System.

The special use airspace within the ROI, as well as restricted areas R-2502N and R-2509, are an integral part of the AFFTC complex. They will not be affected by the base closure, because this airspace is used by other military units and scheduling is expected to remain near full capacity in the future.

3.2.4.3 Air Transportation. Air transportation includes passenger travel by commercial airline and charter flights; business and recreational travel by private (general) aviation; and priority package and freight delivery by commercial and other carriers. The closest commercial airline service to George AFB is at Ontario International Airport, approximately 45 road miles and 50 minutes driving time to the southwest on the eastern city limits of Ontario, California. Palmdale Airport is approximately 50 road miles and 55 minutes driving time to the west of George AFB.

Ontario International Airport is substantially larger in terms of passenger volume than Palmdale Airport, although both carry only a fraction of the passengers handled each year by Los Angeles International Airport in the city of Los Angeles, approximately 2 to 3 hours driving time to the west of George AFB. Recent (1990) annual passenger volumes at the three airports were as follows (Los Angeles Department of Airports, 1991):

- Ontario International Airport - approximately 5.4 MAP
- Palmdale Airport - less than 0.1 MAP
- Los Angeles International Airport - approximately 45.8 MAP

Ontario International Airport served as a shipping and receiving point for approximately 210,000 tons of cargo in 1986, the most recent year for which

comprehensive regional air cargo data are available (SCAG, 1991). This represented approximately 17 percent of all Southern California air cargo shipments in that year. Los Angeles International Airport accounted for 82 percent of air cargo volume in that year, while Burbank, John Wayne, and Long Beach airports combined represented only 1 percent of regional air cargo activity (SCAG, 1991).

San Bernardino County operates the Apple Valley Airport, about 10 miles east of the base, the Barstow Airport, about 30 miles to the northeast, and the Hesperia Air Lodge, about 20 miles to the south. These three smaller airports are used mostly by private aircraft owners, and none have scheduled airline flights (San Bernardino County, 1988a).

Upon closure of George AFB there would be a very small reduction in travel through the Ontario and Palmdale Airports resulting from the loss of base personnel and dependents who currently use the airports. As with highway transportation, the loss of base-related air travel would be more than compensated by projected rapid population growth in the Victor Valley and adjacent areas. Likewise the closure of Norton AFB would minimally reduce air passenger travel through the Ontario and Palmdale airports.

3.2.4.4 Railroads. The Victor Valley is served by three major transcontinental railroads: Southern Pacific, Union Pacific, and the AT&SF (Figure 3.2-7). The lines of the latter two traverse north-south about 0.5 mile east of the George AFB eastern boundary; the Southern Pacific line runs in a generally east-west direction across the southern part of the Victor Valley from the Palmdale area. All three of these lines continue south through the Cajon Pass (where trackage is shared) into the San Bernardino Valley.

In 1942, about 2 miles of 100-foot-wide railroad spur right-of-way was acquired between the Union Pacific/Santa Fe line and the easterly base boundary, at a point about 3,000 feet south of Air Base Road (Figure 3.2-8). The route crosses both National Trails Highway and Air Base Road. The right-of-way continues northwesterly from the base boundary about 2 more miles through the munitions storage area, across Air Base Road again, and into the main warehouse area at the base's flightline. The spur was declared excess property in 1979 and the trackage was removed and sold in 1986. The right-of-way, however, remains in government ownership. This right-of-way could become an integral part of any reuse of George AFB (VVEDA, 1990).

Since the end of October 1990, AMTRAK service has been available to the Victor Valley. The station is at the intersection of 7th Street and SR 18 in Victorville. During the first 3 months of 1991, the station was used by 1,149 passengers.

There is currently a proposal to construct an SST line between Las Vegas, Nevada, and Anaheim, California. This privately financed proposal for a train using magnetic levitation technology is projected to begin operations in the year 2000. The system will be designed to carry up to 4 MAP (California-Nevada Super Speed Train Commission, 1990b). The proposed alignment could pass very near George AFB, and with a station there, could provide access to the Victor Valley. The final alignment will not be determined until completion of an EIS/EIR and approval by both the California and Nevada state legislatures. This approval is currently scheduled for 1993. In August 1990, the SST Commission designated a consortium headed by the Bechtel Corporation to be the franchisee (subject to a franchise agreement) to build and operate the train. The Bechtel consortium would have the responsibility for developing a plan that would include the route and stations (number and locations) to be served (California-Nevada Super Speed Train Commission, 1990b).

Upon closure of George AFB, there would be some very small reductions in use of the AMTRAK system in Victorville. These reductions would be quickly overcome by the projected rapid population growth in the Victor Valley.

3.2.5 Utilities

The utility systems addressed in this analysis include the facilities and infrastructure used for:

- Potable water pumping, treatment, storage, and distribution
- Wastewater collection and treatment
- Solid waste collection and disposal
- Energy generation and distribution, including the provision of electricity and natural gas.

The ROI for utilities includes systems serving George AFB as well as the surrounding Victor Valley area. The major attributes of utility systems in the ROI are processing and distribution capacities, storage capacities, average daily consumption, peak demand, and related factors required in making a determination of adequacy of such systems to provide services in the future.

Preclosure utilities analyses include the demand for water, wastewater treatment, solid waste disposal, electricity, and natural gas. Because the utility demands associated with the base site were such a small proportion of the service areas of the various utility providers, both on-site and off-site utility demands were combined in the analyses, without differentiation by location.

3.2.5.1 Water Supply. The Victor Valley area and George AFB presently have independent water supply systems. George AFB maintains its own wells, on land leased from the city of Adelanto.

Victor Valley. Within the Victor Valley region surrounding George AFB, there are more than 100 public and private water purveyors covering service areas of various sizes and populations, as well as numerous private wells used for individual residences or agricultural use. The major purveyors (those with over 200 service connections) are:

- Hesperia Water District
- Victor Valley Water District
- Apple Valley Ranchos Water Company
- City of Adelanto Water Department
- Southern California Water Company - Victorville No. 1
- Southern California Water Company - Victorville No. 4
- Southern California Water Company - Victorville No. 5
- County Service Area 70-J
- Mariana Ranchos County Water District
- Apple Valley Heights County Water District.

Virtually all of the water in the Victor Valley is obtained from groundwater sources, although the high desert region presently has an unused allotment of more than 50,000 acre-feet per year (af/yr) of water from the State Water Project. The Mojave Water Agency (MWA) was initially created in 1960 to manage the distribution of this state water allotment throughout an area encompassing the 4,800-square mile of the high desert region, including the Victor Valley.

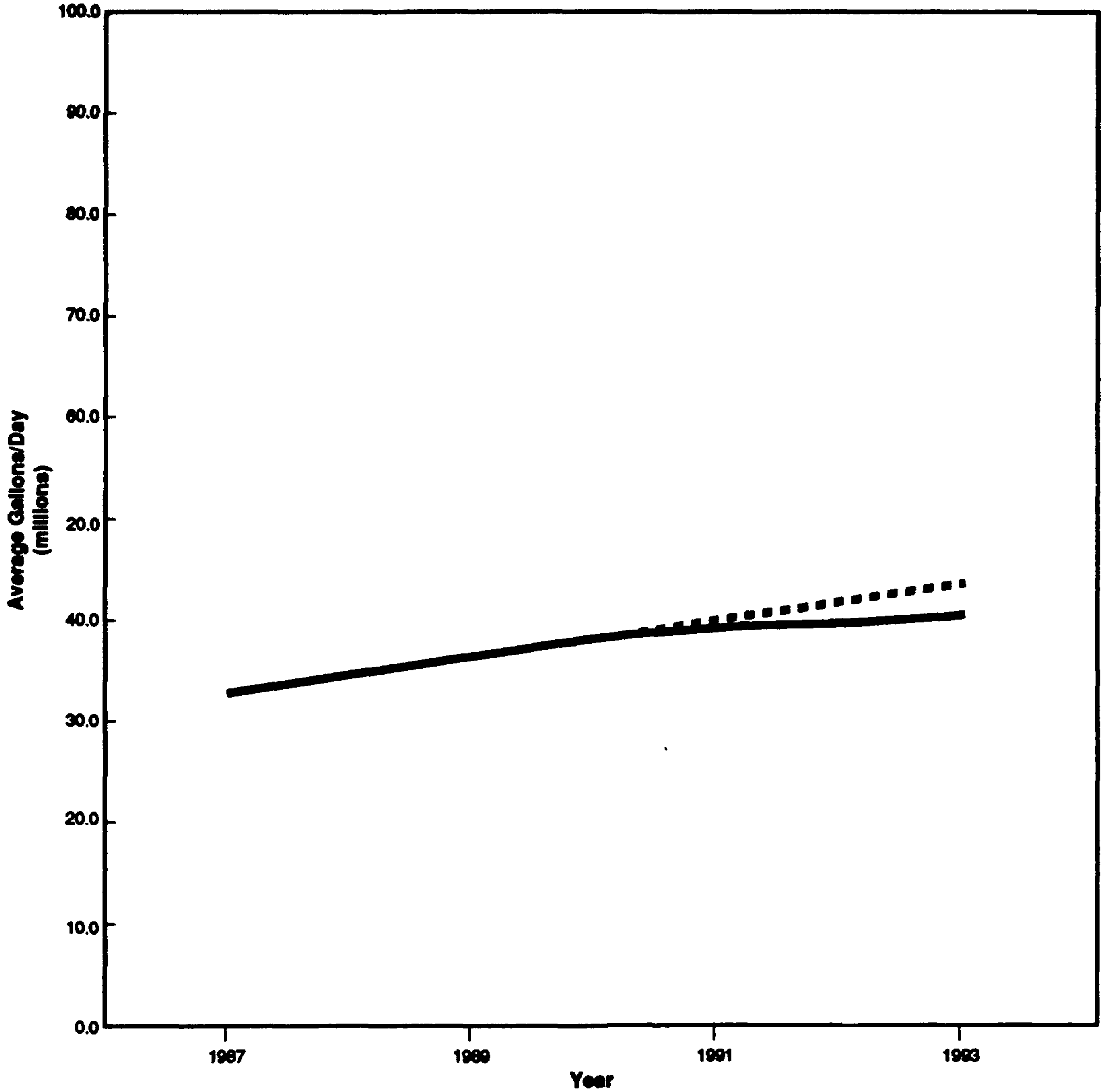
The MWA recently published a water demand projection in the *Master Plan for Delivery of Imported Water: Final Report* (MWA, 1990). In 1990, domestic water demand averaged 38.1 MGD (i.e., 42,700 af/yr) within the Upper Basin Region that underlies Victor Valley (Table 3.2-6 and Figure 3.2-17).

Table 3.2-6. Average Daily Water Demand within the Victor Valley (MGD)

	1987	1990	1993
Implicit Forecast	32.6	38.1	43.7
Closure Baseline	32.6	38.1	40.4
Change from Forecast	0.0	0.0	-3.3
Percent Change	0.0	0.0	-7.6

Source: Based on MWA, 1990.

George AFB. George AFB currently derives its water from eight wells located adjacent to the Mojave River north of Turner Road about 0.5 to 1 mile east of the base. The city of Adelanto leases the land to the Air Force, who installed, operates, and maintains the wells (U.S. Air Force, 1990b). The state water well permit is held jointly by George AFB and the city of Adelanto. The wells vary in depth from approximately 100 to 445 feet, and productive capacities vary from



Source: Based on Mojave Water Agency, 1990.

EXPLANATION

Implicit Forecast

Closure Baseline

Average Daily Water Demand: 1987-1993

Figure 3.2-17

1.0 cubic feet per second (cfs) to 3.56 cfs (Lee and Ro Consulting Engineers, 1984).

Water is pumped uphill from each well to Pumping Station No. 2, located near the wells at an elevation of 2,659 feet. Two ground-level, steel storage tanks and five booster pumps are located nearby. The two tanks have a total storage capacity of 300,000 gallons. The booster pumps convey the water approximately 3 miles from Pumping Station No. 2 to No. 1, located on the base at an elevation of 2,889 feet. The conveying lines between Pumping Station No. 2 and No. 1 consist of three supply mains, two 12- and one 14-inch line that extend west from Pumping Station No. 2 along the north side of Turner Road, and connect to the on-base water treatment and storage plant located east of Starfighter Street.

All incoming water is chlorinated at Pumping Station No. 1. This station has three ground-level steel tanks with a combined capacity of 1.05 million gallons and one elevated steel tank (140 feet high) with a capacity of 500,000 gallons. Two booster stations (Nos.1 and 1A) pump water from the three ground-level storage tanks and elevated tank into the distribution system that runs throughout the main cantonment area (U.S. Air Force Bioengineering, 1990b); facilities south of Air Base Road are also linked to the base water supply system via a 3-inch line; facilities on the west side of the runway connect to a 3-inch line metered by the city of Adelanto Water District (U.S. Air Force, 1990b).

One of the other 12-inch conveying lines that links Pumping Stations Nos. 1 and 2 also connects to an Adelanto Water District pump station and continues westward to an Adelanto Water District ground storage tank. The remaining 12-inch conveying line linking Pumping Station Nos. 1 and 2 also links to the base non-potable water system at a location upstream from Pumping Station No. 1. Non-potable water is stored in the holding pond near the golf course. This water is used primarily for watering the golf course and fire fighting purposes.

It is anticipated that the on-base utilities infrastructure, including the potable water treatment and distribution system, will remain on the base in its current condition after closure.

3.2.5.2 Wastewater. Prior to 1981, George AFB operated its own wastewater treatment plant, located between the housing area and the crosswind runway (U.S. Air Force, 1989b). VVWRA constructed a new secondary treatment plant, located on property adjacent to the northeastern boundary of George AFB, to serve its member communities of Adelanto, Apple Valley, Hesperia, Victorville, Oro Grande (San Bernardino County Service Area [CSA] No. 42), and Spring Valley Lake (CSA No. 64). When the VVWRA treatment plant came on line, George AFB contracted for service from the VVWRA and interceptor lines were constructed to connect the base with the plant.

Victor Valley. The VVWRA activated sludge plant currently treats an average of about 6.5 MGD. Sewage from each community/user is collected via a system of metered interceptor lines and each community/user is billed by the VVWRA on a per-gallon basis. Most of the on-base wastewater mains are gravity flow and run toward the north side of George AFB. The revenue source funds normal maintenance and operation of the interceptor system and the treatment plant. Additionally, a one-time fee for new connections of industrial, commercial, or residential facilities or other users within each of the VVWRA member communities is assessed by VVWRA. This fee is calculated for each new connection based on the projected wastewater flows expected from the facility and is deposited in a capital improvements fund for future expansion of the plant or interceptor system. Each community/user operates and maintains the wastewater collection system within its boundaries, metering and charging its customers accordingly. George AFB differs from other users in that the base has a contracted maximum flow limit (0.83 MGD), and no voting rights as a member of VVWRA. VVWRA discharges approximately 91 percent of its advanced secondary treated effluent into the Mojave River and approximately 9 percent of its standard secondary treated effluent into percolation ponds for groundwater recharging (California Regional Water Quality Control Board, 1989; Kurtz, 1991).

By February 1991, VVWRA had completed construction of a sludge-drying lagoon (evaporative basin). The bricks produced in this basin are to be stored on site until an appropriate disposal technique is selected (expected in 2 years). During the first half of 1990 (through July), a contractor removed one-third of the sludge inventory from the sludge-holding lagoon (where it had been held since plant start-up in 1981) for use on agricultural land in California. Screenings and grit from the VVWRA processing, amounting to 329 cubic yards in 1990 (0.14 cubic yards per million gallons treated) were hauled to a local landfill. Skimmings are currently discharged into thickening lagoons (Kurtz, 1991).

George AFB. The base has two metered lines that connect to the VVWRA interceptor system. Line one services the flightline area and collects about 65 percent of base wastewater flows. This 15-inch line runs from south of the abandoned on-base wastewater treatment plant northeast to the treatment plant. Line two services the residential areas and the hospital and collects the remaining 35 percent of base wastewater flows. The base flow rate is normally between 0.8 and 0.85 MGD. Wastewater from buildings on the west side of the runways and south of Air Base Road is disposed of in septic systems and leaching fields (U.S. Air Force, 1989b).

In April 1987, VVWRA issued George AFB an "Order Requiring Corrective Action Pursuant To VVWRA Sewer Use Ordinance." This corrective action order (CAO) outlined seven specific non-compliance issues related to wastewater flows from George AFB received at the VVWRA treatment plant and due dates for

corrective actions in order to regain compliance with the VVWRA Sewer Use Ordinance.

The non-compliance issues include: George AFB mixing of industrial and residential wastewater; high levels of volatile organics, benzene, viscous oil, and other toxic materials discharged to the VVWRA treatment facilities; and storm water directly entering the sewer collection system without pretreatment. Required corrective actions include: submittal to VVWRA of a spill containment program; industrial and domestic wastewater separation; storm water runoff separation from the sewer collection system; and VVWRA approved pretreatment and oil separator facilities (VVWRA, 1987).

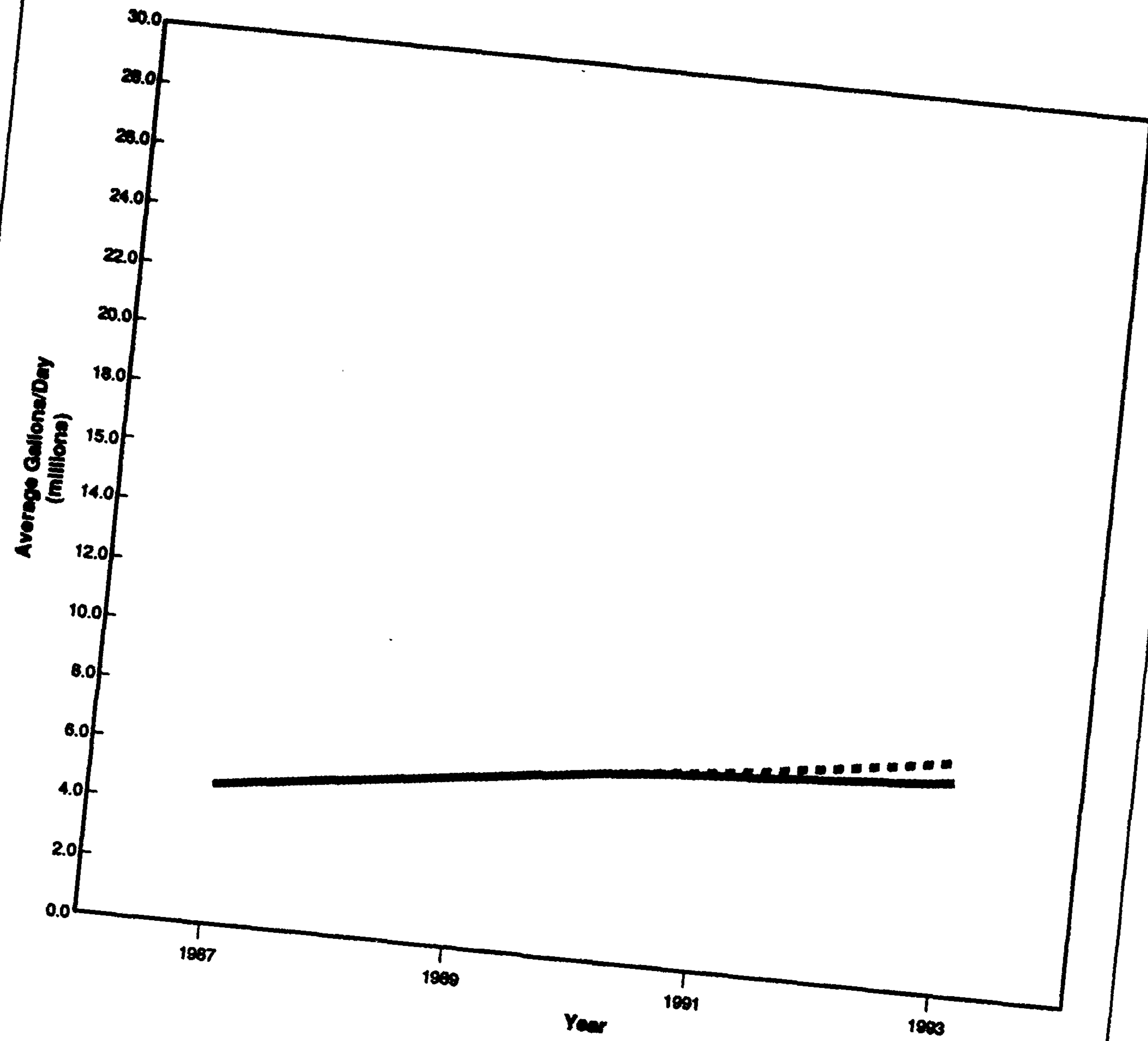
The CAO identified April 10, 1989 as the deadline for full compliance with the order; however, in April 1988, the base requested and received an extension of the deadline until June 1990 (VVWRA, 1988). In January 1989, base officials notified VVWRA, that in view of the impending closure of George AFB, the design of a pretreatment facility necessary to comply with the CAO, which was approximately 60 percent complete, had been canceled. The base indicated that it would continue ongoing efforts to minimize industrial discharges to the sewer collection system via chemical product/soap substitution, source control procedures, and use of oil/water separators (VVWRA, 1989; U.S. Air Force, 1989b). VVWRA notified the Air Force that because compliance with the CAO had not been achieved, future discharges from the base by future base occupants other than the Air Force must fully comply with VVWRA ordinances, if the new user is served by VVWRA.

Based on the forecast population decline in the Victor Valley associated with the closure of George AFB and the implicit future rates of per-capita wastewater treatment demand indicated in the *Wastewater Master Plan*, the VVWRA forecast would be reduced to an average of 6.7 MGD by the year 1993 (Table 3.2-7; Figure 3.2-18). This reduction is approximately 8 percent lower than the extrapolated VVWRA projection for the year 1993. VVWRA has indicated that projection in the plan does not necessarily reflect current estimates as a result of recent population changes within the Victor Valley since publication of the plan.

Table 3.2-7. Wastewater Generation within the Victor Valley Wastewater Treatment Authority Service Area (in MGD)

	1987	1990	1993
Implicit Forecast	4.3	5.8	7.3
Closure Baseline	4.3	5.8	6.7
Change from Forecast	0.0	0.0	-0.6
Percent Change	0.0	0.0	-8.1

Source: Based on VVWRA, 1988.



Source: Based on VVWRA, 1988.

EXPLANATION

Implicit Forecast

Closure Baseline

Average Daily Wastewater Generation: 1987-1993

Figure 3.2-18

VVWRA and member collection agencies that serve the communities in the Victor Valley are presently planning both short- and long-term infrastructure improvements on a relatively large scale in anticipation of substantial rates of population growth and increased conversion from septic tank usage to centralized treatment. The VVWRA treatment plant was designed for continued growth in the region and has an ongoing expansion plan. The current 9.5-MGD capacity of the plant is expected to be adequate for the VVWRA service area until about 1995. In the *Wastewater Master Plan*, three alternate scenarios for improvement of the existing infrastructure are analyzed. These three alternatives are continued expansion of the existing interceptor system and treatment plant to accommodate the entire Victor Valley, construction of two sub-regional treatment plants, and a combination of the first two scenarios with a single new treatment plant located in the Apple Valley. Since publication of the plan in 1988, various improvements have been made including substantial enlargement of the capacity of the existing central treatment plant.

3.2.5.3 Solid Waste. Solid waste from George AFB currently is disposed of in the Victorville landfill, operated by San Bernardino County. The landfill is located in a hilly area approximately 5 miles northeast of the base in an unincorporated area of the county, immediately north of the city of Victorville. The facility is designated as a Class III landfill, suitable for the disposal of non-hazardous and general municipal waste. Presently, the landfill will accept clean construction and demolished building material with no volume restrictions. However, the county landfill is planning to collect fees for such materials beginning in summer 1991 (Stager, 1991).

Victor Valley Disposal is the private hauler for both George AFB and a total of approximately 113,000 persons in Adelanto, Apple Valley, and Victorville. The private hauler annually collects 420 tons (approximately 6,800 cubic yards) from the base and these municipalities. George AFB contributes approximately 5 to 7 percent of the total waste.

The San Bernardino County Solid Waste Management Department (SWMD) recently prepared updated solid waste demand and capacity projections for all county landfills, including those in Apple Valley, Hesperia, Phelan, and Victorville.

The Victorville landfill had 420,775 cubic yards of remaining capacity on permitted land as of June 30, 1990. At the current rate of 510 cubic yards per day (186,150 cubic yards per year), the site's life expectancy is 2 years (through 1992). The U.S. Bureau of Land Management (BLM) owns additional land with a potential capacity of approximately 5 million cubic yards near the existing site; however, this area is not presently permitted for use as a landfill (San Bernardino County SWMD, 1991). The Hesperia landfill had a remaining capacity of 958,000 cubic yards on currently permitted land as of June 30, 1990, with a life expectancy of approximately 6 years (through the year 1996). The county is actively seeking to permit adjacent land with an undetermined potential

expansion capacity. As of June 30, 1990, the Phelan landfill had a remaining capacity of 847,250 cubic yards, with a life expectancy of 16 years (through the year 2006); the SWMD did not indicate any expansion potential at the Phelan landfill. The Apple Valley landfill had a remaining capacity of 172,430 cubic yards with a life expectancy of 2 years (through the year 1992). This site was reported to have a potential 1.55-million cubic yard expansion capacity, although the report also indicated that expansion of this landfill was not "actively pursued" (San Bernardino County SWMD, 1991).

Solid waste in the Victor Valley region tends to be less dense than in other metropolitan areas (50 to 55 pounds per cubic yard compared to 80 pounds per cubic yard) as a result of the slow plant growth in the area and corresponding reduction of plant material waste products (Barnes, 1991). The county presently is encouraging source reduction and recycling objectives that meet or exceed the objectives of State Assembly Bill 939, which would result in a 60-percent combined source reduction and recycling by the year 2010. The Victorville landfill currently utilizes post-sorting by contract salvagers, which results in recovery of less than 0.2 percent of solid waste received. Additional time for salvage could increase this rate to more than 1.5 percent (San Bernardino County SWMD, 1991).

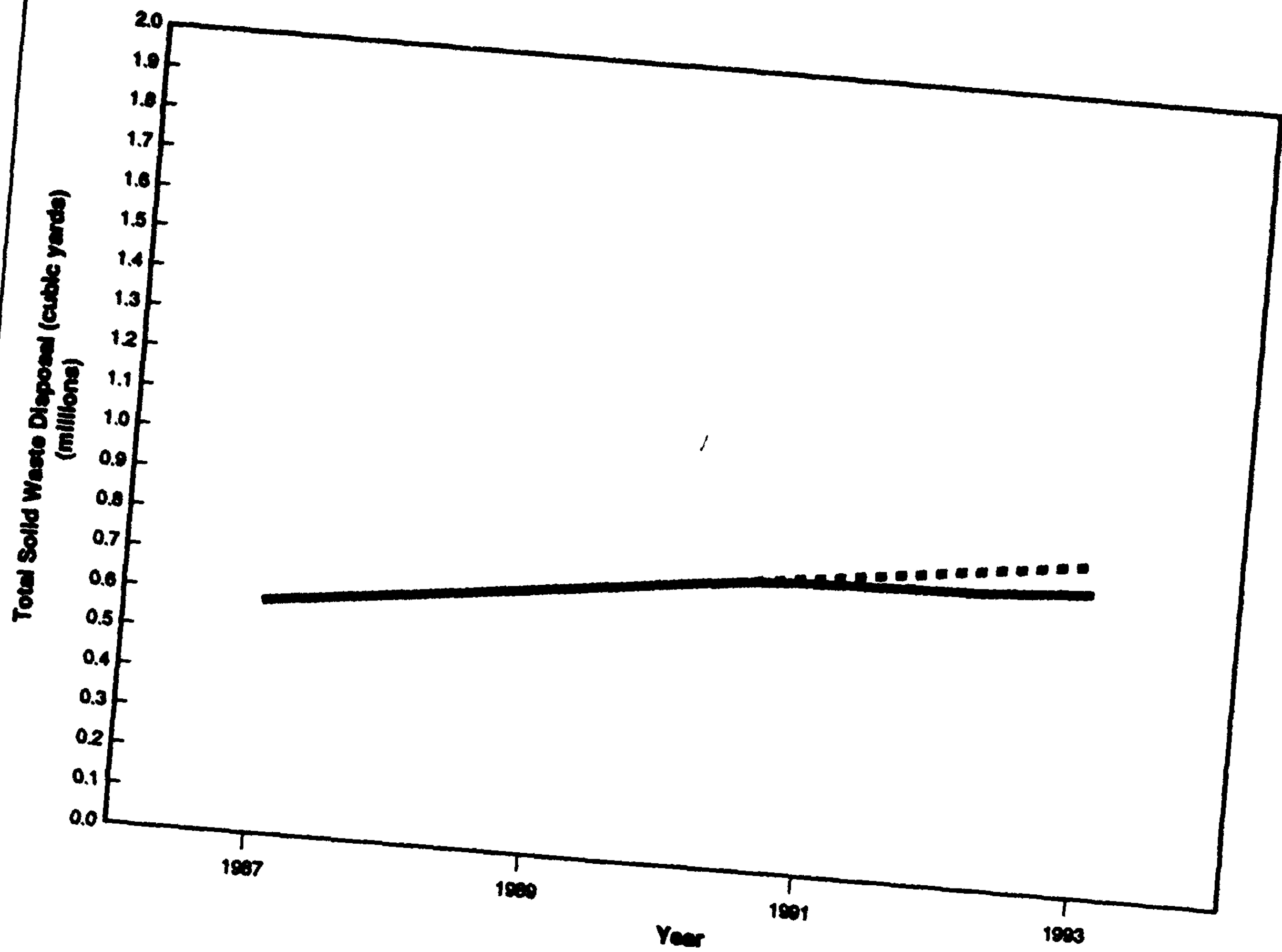
Several county-owned or -operated disposal sites in the surrounding region, notably Big Bear and Lucerne Valley, are nearing or at capacity, and are under consideration for replacement by small transfer stations following base closure. In the Victor Valley, the Apple Valley landfill is also receiving the same consideration to convert its operations to a transfer station in 1992. The waste from these transfer stations may be diverted to the Victorville landfill, but the amount of material from the small landfills will have only a minor effect on long-term landfill capacity in the high desert (San Bernardino County, 1991). Sludge from the VVWRA wastewater treatment plant is not deposited in the Victorville landfill but is placed in an on-site VVWRA sludge lagoon at the treatment plant; therefore, increased activity expected at the treatment plant is not expected to have an impact on the landfill.

According to county projections, the desert region's landfills will have adequate capacity through the year 2030 (San Bernardino County SWMD, 1991).

Table 3.2-8 and Figure 3.2-19 indicate the implicit projection of the SWMD at current rates of disposal for the four Victor Valley landfills.

3.2.5.4 Energy

Electricity. Electricity is provided to George AFB and the surrounding Victor Valley area by the High Desert District of SCE. The District consisted of 101,000 metered customers in 1990. The region is currently utilizing alternate electrical generating techniques, including the Solar One project in Daggett and various



Sources: Based on San Bernardino County Solid Waste Management Department, 1989, 1991.

EXPLANATION

Implicit Forecast

Closure Baseline

Total Solid Waste Generation: 1987-1993

Table 3.2-8. Solid Waste Generation within the Victor Valley (millions of cubic yards per year)

	1987	1990	1993
Implicit Forecast	0.61	0.74	0.87
Closure Baseline	0.61	0.74	0.80
Change from Forecast	0.0	0.0	-0.07
Percent Change	0.0	0.0	-8.0

Sources: Based on San Bernardino County SWMD, 1989, 1991.

photovoltaic projects, because the high desert region has a high potential for solar electric generation capability.

SCE supplies electricity to George AFB through parallel connections of two manually-switched, 33-kilovolt (kV) circuits terminating at two power transformers at the on-base substation. The substation is on the west side of Starfighter Street, across from the water storage and treatment plant, and feeds a 4-kV distribution grid comprising six main circuits. The on-base substation and distribution system is owned by the Air Force. A few facilities on the west side of the runways are serviced through a separate metered connection from the Adelanto area.

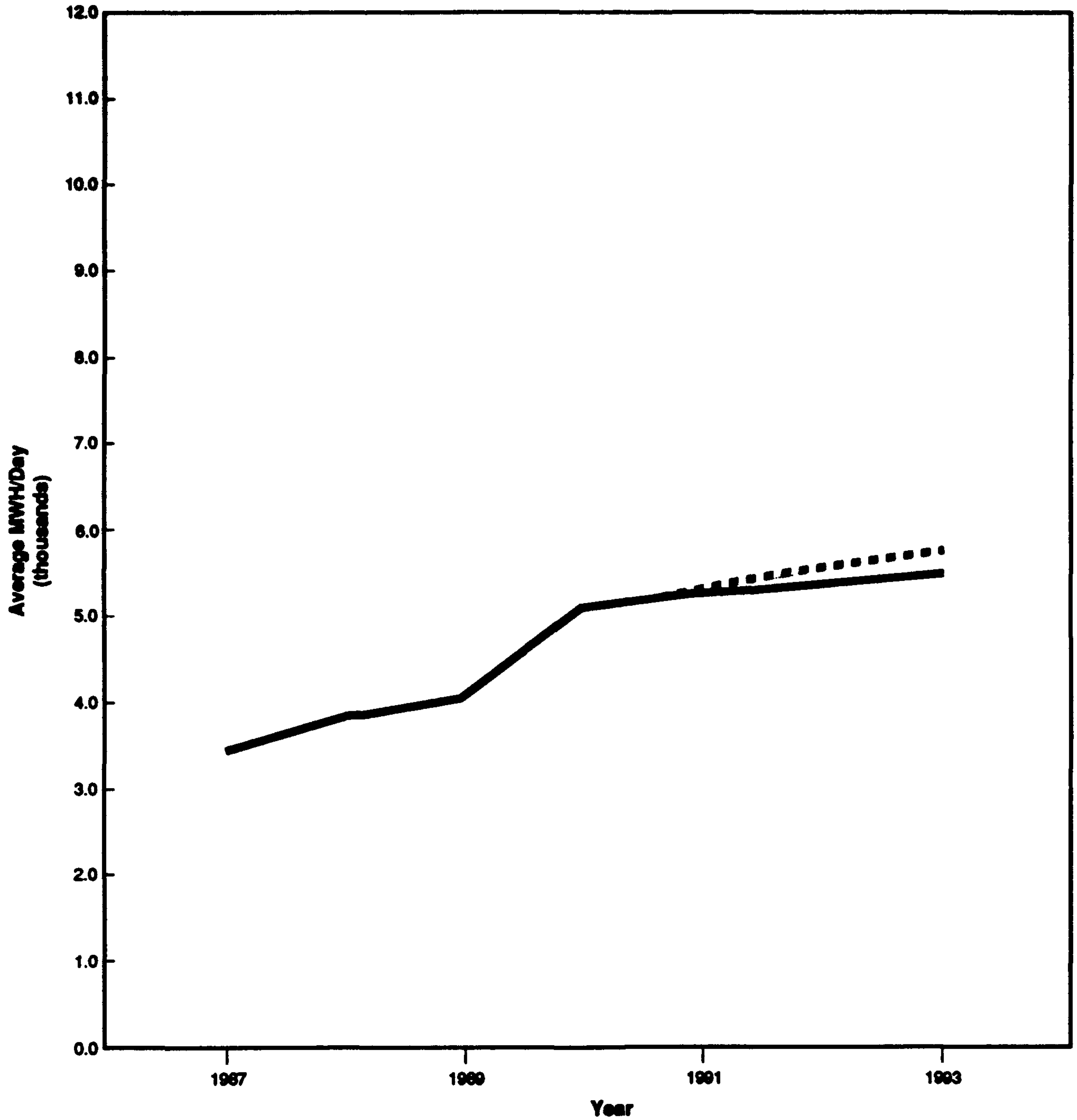
The reduction in electricity demand within the district associated with the closure of George AFB was estimated from the projected population decline in the Victor Valley and average per-capita electricity demand under closure baseline conditions (Table 3.2-9; Figure 3.2-20).

Table 3.2-9. Electricity Demand within the Victorville District of Southern California Edison (in MWH per day)

	1987	1990	1993
Implicit Forecast	3,420	5,070	5,738
Closure Baseline	3,420	5,070	5,446
Change from Forecast	0.0	0.0	-292
Percent Change	0.0	0.0	-5.1

Sources: Based on California Energy Commission, 1990; SCE, 1991.

Natural Gas. Service to George AFB and the high desert region is provided by SW Gas. Natural gas is provided via a 4-inch high pressure gas line entering the base from the west near Gasoline Alley and extending to a metering and regulating station, on the east side of Sno Street. Approximately 36,000 linear feet of Air Force-owned gas lines extend through most areas of the base from this station, except the facilities west of the runways and south of Air Base Road. The estimated on-base gas demand for space heating, water heating, and other natural gas appliances totalled 219,886 cubic feet per hour in 1985. The annual gas consumption declined between 1987 and 1989.



Sources: Based on California Energy Commission, 1990; Southern California Edison Company, 1991.

EXPLANATION

- - - - Implicit Forecast

——— Closure Baseline

Average Daily Electricity Demand: 1987-1993

Figure 3.2-20

SW Gas anticipated no future restrictions to natural gas service because a 30-inch, high-pressure, natural gas pipeline (owned by Southern California Gas Company) has an existing tap near the intersection of Rancho and Adelanto roads. Although the existing tap is not yet in service, this line could be used by SW Gas to supply additional demands in the area of the base (Goodman, 1991).

In 1989 SW Gas prepared a long term forecast of population within the Victorville District. Natural gas consumption rates within the district for the past 5 years (1986 to 1990) were used to estimate an average per-capita demand factor for the district and obtain an implicit projection of future natural gas consumption based on the total population projections (SW Gas, 1991). Using the same per-capita rate, the reduction in natural gas demand within the district associated with the closure of George AFB was estimated from the projected population decline in the Victor Valley under closure baseline conditions (Table 3.2-10; Figure 3.2-21).

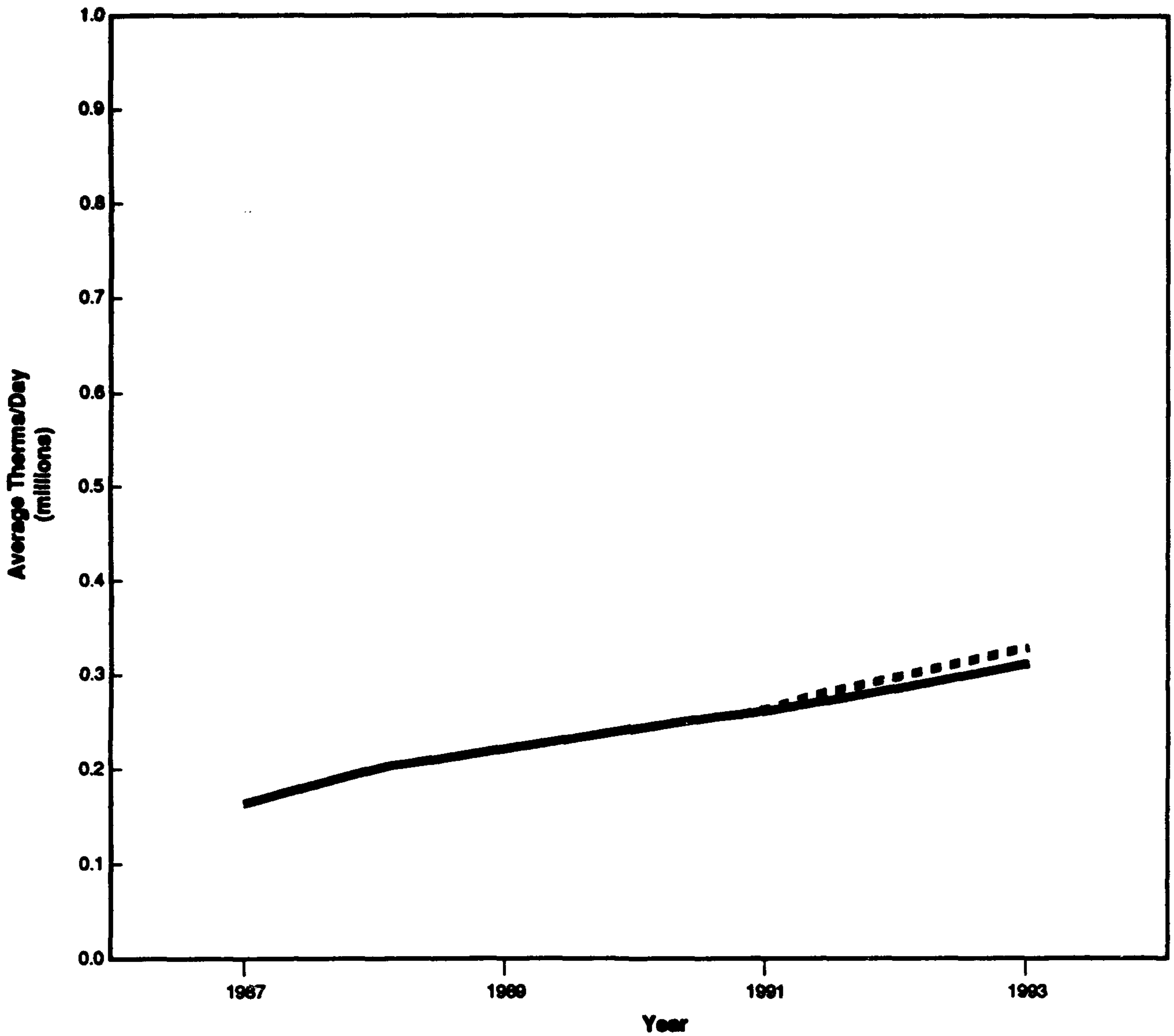
Table 3.2-10. Natural Gas Demand within the Victorville District of the Southwest Gas Company (in therms/day)

	1987	1990	1993
Implicit Forecast	161,995	240,100	321,976
Closure Baseline	161,995	240,100	305,680
Change from Forecast	0.0	0.0	-16,296
Percent Change	0.0	0.0	-5.1

Source: Based on SW Gas, 1991.

3.3 HAZARDOUS MATERIALS/HAZARDOUS WASTE MANAGEMENT

Hazardous materials and hazardous waste management activities at George AFB are governed by specific environmental regulations. For the purpose of the following analysis, the term hazardous waste or hazardous materials will mean those substances defined as hazardous by the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), 42 U.S. Code (USC) §§9601-9675, and the Solid Waste Disposal Act, as amended by the Resource Conservation and Recovery Act (RCRA), 42 USC §§6901-6992. In general, this includes substances that, because of their quantity, concentration, or physical, chemical, or infectious characteristics, may present substantial danger to public health or welfare or the environment when released into the environment. Additionally, the U.S. Environmental Protection Agency (EPA) has granted the state of California the authority to promulgate and enforce environmental regulations. The state regulations, which must be at least as stringent as the federal regulations, are outlined in the California Code of Regulations (CCR), Title 22, Section 30.



Source: Based on Southwest Gas Company, 1991.

EXPLANATION

Implicit Forecast

Closure Baseline

Average Daily Natural Gas Demand: 1987-1993

Figure 3.2-21

Hazardous materials transportation is regulated by the Federal Department of Transportation (DOT) regulations within Chapter 49 of the Code of Federal Regulations (CFR).

The ROI encompasses all geographic areas that are exposed to the possibility of a release. The ROI for IRP sites is within the existing base boundaries, with the exception of the Northeast Disposal Area, where a TCE-contaminated groundwater plume has migrated off base. Specific geographic areas affected by past and current hazardous waste operations, including cleanup activities, are presented in detail below.

3.3.1 Hazardous Materials Management

Preclosure Reference. Operations at George AFB currently use hazardous materials including aviation fuels, oils, lubricants, hydraulic fluids, solvents, corrosives and compressed gases. The Hazardous Materials (HAZMAT) Handlers Business Plan (U.S. Air Force, 1990f) and The Spill Prevention and Response Plan (U.S. Air Force, 1991d) address the prevention of the discharge of pollutants and include contingency plans to address unauthorized releases. The HAZMAT Plan and The Spill Prevention and Response Plan also disclose the storage location of hazardous materials that are shipped to the base. At closure, hazardous materials will be transferred for use to other installations through the Air Force supply system, marketed for reuse through the Defense Reutilization and Marketing Office (DRMO), or disposed of in accordance with applicable regulations.

Closure Baseline. After base closure, only the DMT and possible interim users will be using hazardous materials. All parties will be responsible for managing these materials in accordance with federal, state, and local regulations; for protecting their employees from occupational exposure to hazardous materials; and for protecting the public health of the surrounding community.

The DMT will be responsible for the safe storage and handling of all hazardous materials used in conjunction with all base maintenance operations, such as paint, paint thinner, solvents, pesticides, herbicides, fungicides, and miscellaneous petroleum products associated with vehicle and machinery maintenance. These materials will be shipped by the DMT in compliance with the Hazardous Materials Transportation Act (HMTA) under 49 CFR. The DMT and regulatory authorities will have oversight to ensure compliance with all applicable regulations.

If the Air Force authorizes interim use of base facilities prior to disposal, it will require that all hazardous materials used by an interim user be shipped, stored, and handled in compliance with pertinent regulations by the interim user. Again, the DMT and the regulatory authorities will have oversight to ensure compliance with all applicable regulations.

In accordance with federal, state, and local regulations all parties will be responsible for the management of hazardous materials. Occupational Safety and Health Administration (OSHA) regulations under 29 CFR require that all parties must protect their employees from potential occupational exposure to hazardous materials and establish a hazardous communication program to protect the surrounding community from a release of a hazardous material; appropriate parties must file a Hazardous Materials Business Plan with the San Bernardino County Department of Environmental Health Services (DEHS).

3.3.2 Hazardous Waste Management

Preclosure Reference. A variety of hazardous wastes are generated as a result of maintenance activities on George AFB. These substances include fuel and oil wastes, solvents, strippers, paint wastes, and several other chemical wastes. As required by CCR, Title 22, Section 66493 (b) these hazardous wastes and quantities generated are reported to the California Department of Health Services (DHS) Toxic Substances Control Division.

As a result of an RCRA Part A permit application submission, George AFB operated as an interim status Hazardous Waste Storage Facility under a California DHS 5-year permit issued 28 June 1985. That permit authorized on-site storage within a designated area for up to 1 year. The DRMO operated the permitted Hazardous Waste Storage Yard for the Air Force. Numerous Storage Accumulation Points were designated throughout the installation to facilitate the daily collection and temporary storage (90 days) of hazardous wastes. The wastes were transported to the Hazardous Waste Storage Yard prior to the expiration of the 90-day storage limit.

In view of the impending closure of the installation, an RCRA Part B permit application, requesting permanent permit status for the Hazardous Waste Storage Yard, has not been filed. As a result, the facility lost its interim status as a storage facility on June 28, 1990 and has since become a 90-day storage facility. Hazardous wastes are stored temporarily at 29 90-day Accumulation Points and 6 Satellite Accumulation Points (Table 3.3-1). The wastes are transported off base and disposed of by a licensed contractor in accordance with RCRA as implemented by 40 CFR Parts 260-270 and CCR Title 22 prior to the expiration of the ˥porary 90-day storage limit. Permitting information can be found in Appendix G.

George AFB has several plans that address hazardous waste management on the base. The Spill Prevention and Response Plan addresses the discharge of pollutants and includes a contingency plan to address unauthorized releases.

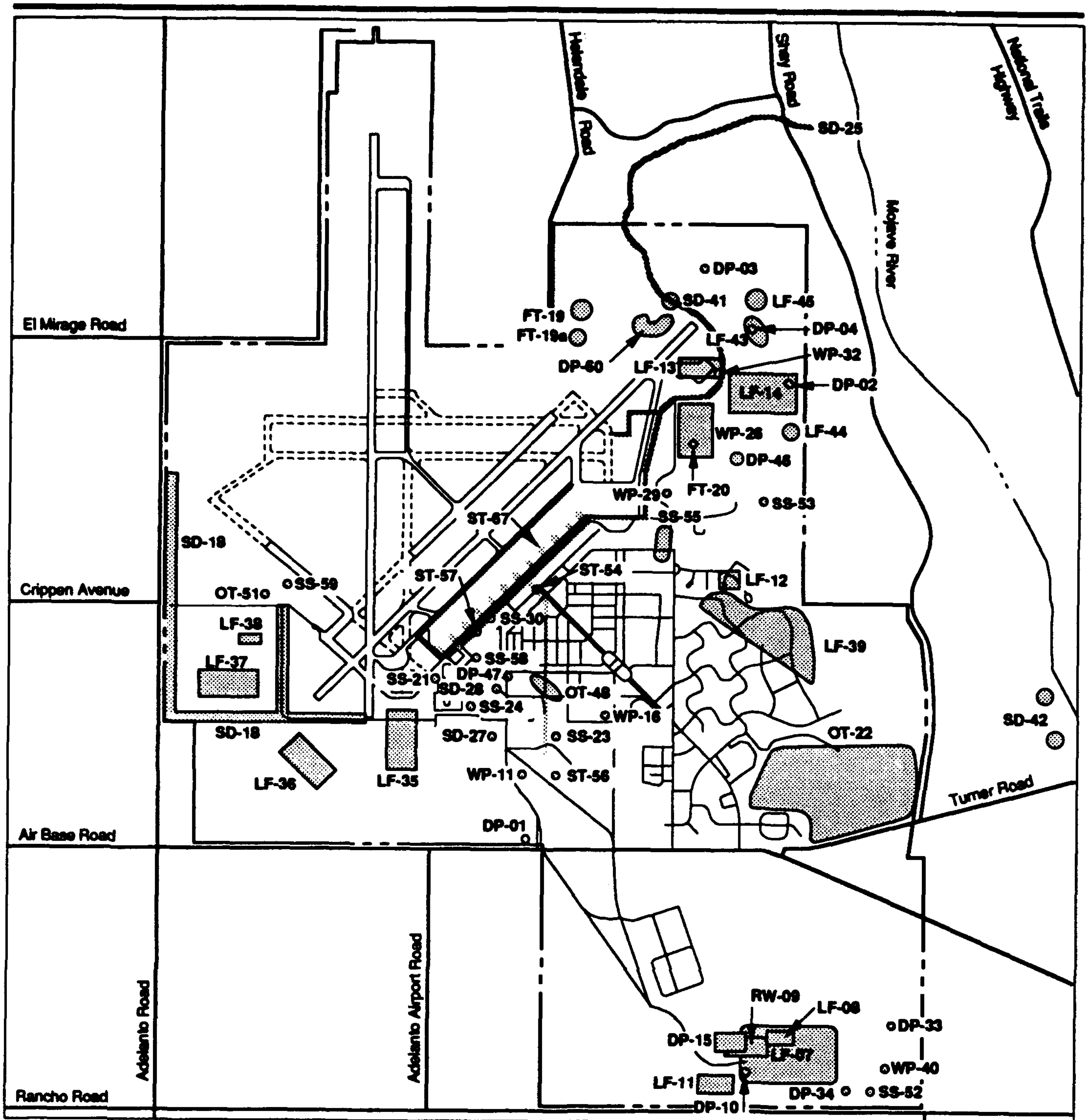
Closure Baseline. At the time of base closure, all of the hazardous waste generated by base functions will have been collected from all accumulation points and disposed of at a permitted facility, in accordance with RCRA.

Table 3.3-1. Hazardous Waste Storage Locations

Site	Location (Building #)	Description
Accumulation Points (90-day storage)		
1	18	Auto Hobby Shop
2	310	Flight Simulator
3	538	Supply Inspection Section
4	540	Power Production
5	552	Fuel Truck Maintenance
6	555	Vehicle Maintenance
7	559	Armament Shop
8	564	NDI Shop
9	652	Corrosion Control
10	659	CE Material Control
11	670	Liquid Fuel Maintenance
12	676	Phase Section
13	676	Phase Section
14	676	Wheel and Tire Shop
15	682	AGE Section
16	682	Corrosion Control
17	683	Training Section
18	685	Fuel Shop
19	685	Fuel Shop
20	686	Propulsion Branch and Test Cell
21	691	561/562/563 AMU
22	719	20 AMU Support Section
23	720	Support Section
24	720	21 AMU
25	724	Fire Department
26	756	Corrosion Control
27	761	Alert Hangar
28	785	Missile Maintenance
29	789	AGE Section
Satellite Accumulation Points		
1	513	Entomology
2	551	Fuels Testing
3	553	ECM Shop
4	768	Combat Munitions Unit
5	1120	Munitions Inspection
6	1155	Hospital

Source: U.S. Air Force, 1989a.

Hazardous waste generated by the DMT will be tracked to ensure proper identification, storage, transportation, and disposal, as well as implementation of waste minimization programs. The Hazardous Waste Storage Yard (site SS-23) (Figure 3.3-1) is an IRP designated site and will be studied, evaluated, remediated, and closed under CERCLA and all other applicable regulations.



EXPLANATION

---- Base Boundary

==== Abandoned Runway

Installation Restoration Program Sites

Figure 3.3-1

3.3.3 Installation Restoration Program (IRP) Sites

IRP is an Air Force program to identify, characterize, and remediate environmental contamination on its installations. Although legally acceptable at the time, procedures followed prior to the mid-1970s for managing and disposing of many wastes often resulted in contamination of the environment. The program has established a process to evaluate past disposal sites, control the migration of contaminants, and control potential hazards to human health and the environment. Section 211 of the Superfund Amendment and Reauthorization Act (SARA), codified as the Defense Environmental Restoration Program (DERP) of which the Air Force IRP is a subset, ensures that DOD has the authority to conduct its own environmental restoration programs.

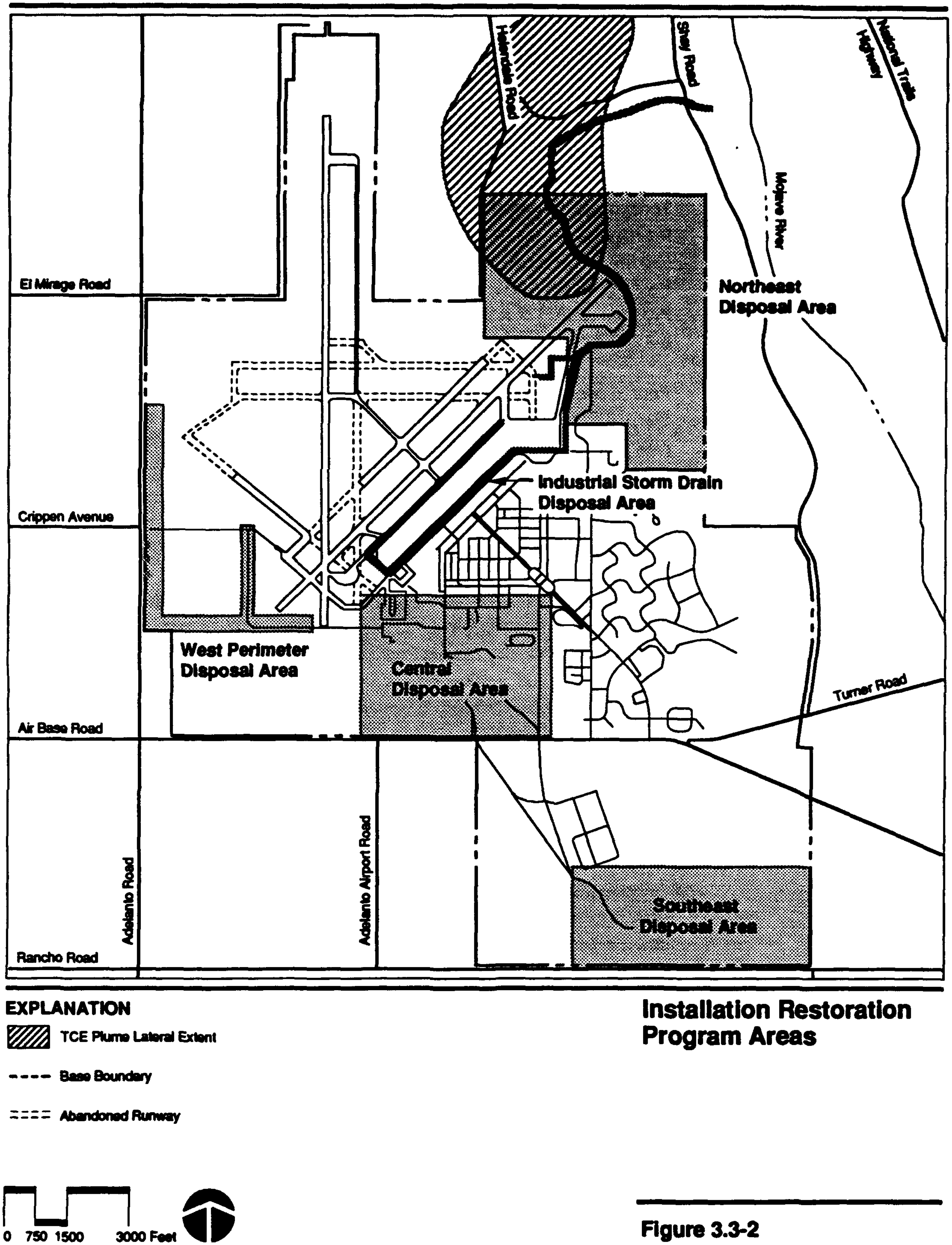
Prior to passage of SARA and the establishment of the National Contingency Plan (NCP) for hazardous waste sites, Air Force IRP procedures followed DOD policy guidelines mirroring EPA's Superfund Program. Since SARA was passed, most federal facilities have been placed on a federal docket and EPA has been evaluating the facilities' waste sites for inclusion on the NPL. George AFB was officially listed on the NPL on February 12, 1990, primarily because of groundwater contamination within the Northeast Disposal Area (Figure 3.3-2).

In October 1990, the U.S. Air Force entered into a Federal Facilities Agreement (FFA) with U.S. EPA Region IX, the state of California (DHS) and the California Regional Water Quality Control Board (RWQCB) Lahontan Region. The California DHS authority has now transferred to the California Environmental Protection Agency (California EPA), Department of Toxic Substance Control (DTSC). The FFA stipulates that any corrective actions under RCRA shall be considered and managed pursuant to CERCLA. Objectives, responsibilities, procedures and schedules for cleanup were also established in the FFA. A representation of the IRP management process under CERCLA is shown in Figure 3.3-3.

Ongoing activities at identified IRP sites may delay or limit some proposed land uses at or near those sites. Future land uses by the reuse organization on a site-specific level may be, to a certain extent, limited by the severity of contamination or level of remediation effort at these IRP sites. Regulator review as required by the FFA and the Air Force programs will also ensure any site-specific land use limitations are identified and considered. The FFA and Air Force programs will also ensure sufficient opportunity for public involvement in this decisional process.

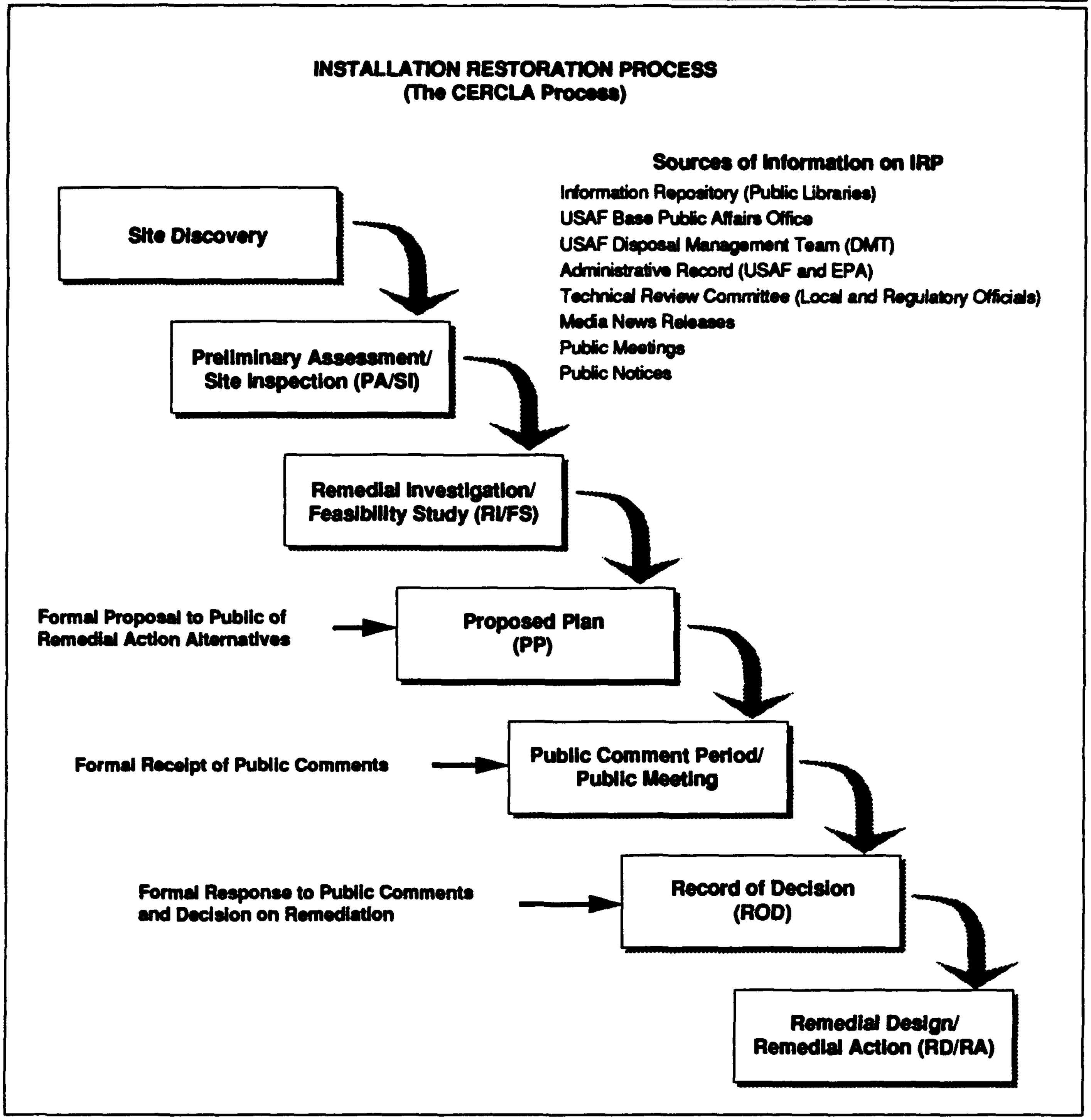
The original Air Force IRP was divided into four phases consistent with CERCLA:

- Phase I: Problem Identification and Records Search
- Phase II: Problem Confirmation and Quantification



Installation Restoration Program Areas

Figure 3.3-2



Pictorial Presentation of IRP Process

Figure 3.3-3

- Phase III: Technology Base Development
- Phase IV: Corrective Action.

After SARA was passed in 1986, the IRP was realigned to incorporate the terminology used by the U.S. EPA and to integrate the new requirements in the NCP. The result was the creation of three action stages:

- Preliminary Assessment/Site Inspection (PA/SI)
- Remedial Investigation/Feasibility Study (RI/FS)
- Remedial Design/Remedial Action (RD/RA).

The PA portion of the first stage under the NCP is comparable to the original IRP Phase I and consists of a records search and interviews to determine whether potential problems exist. A brief SI that may include soil and water sampling is performed to give an initial characterization or confirm the presence of contamination at a potential site.

An RI is similar to the original Phase II and consists of additional field work and evaluations in order to assess the nature and extent of contamination. It includes a risk assessment and determines the need for site remediation.

The original IRP Phase IV has been replaced by the FS and the RD within the third stage. The FS documents the development, evaluation, and selection of remedial action alternatives to clean up the site. The selected alternative is then designed (RD) and implemented (RA). Long-term monitoring is often performed in association with site cleanup to assure future compliance with contaminant standards or achievement of cleanup goals. The Phase III portion of the IRP process is not included in the normal SARA process. Technology Development (TD) under SARA is done under separate processes including the Superfund Innovative Technology Evaluation program. The Air Force has an active TD program in cooperation with the EPA to find solutions to problems common to Air Force facilities.

The closure of George AFB will not affect the ongoing IRP activity. These IRP activities will continue in accordance with federal, state, and local regulations to protect human health and the environment, regardless of the alternative chosen for reuse. The FFA between the U.S. Air Force, U.S. EPA, California DHS, and the California Regional Water Quality Control formalizes the joint involvement in IRP.

Again, the public may keep abreast of the IRP at George AFB through various sources of information (see Figure 3.3-3). More information about the public comment process may be obtained by contacting the base Public Affairs Office or the Disposal Management Team's Environmental Programs Office. Additionally, the IRP as mandated by CERCLA and the NCP has a public

participatory program much like the one in the preparation of this EIS. The Air Force will, with the acceptance of each RI/FS by the regulatory community, prepare a proposed plan for the remediation of a site(s) which will include a discussion of alternatives considered. The proposed plan will be distributed to the public for comment; a public meeting will be held to discuss the proposed plan and comments on the proposed plan will be accepted by the Air Force. The Air Force will then respond to all comments making those responses part of a public ROD on what the remediation will entail prior to any Remedial Action being taken (see Figure 3.3-3).

Preclosure Reference. Because the Air Force began the IRP process at George AFB in 1981, prior to terminology and procedural changes, both phases and stages are contained in the IRP Information Repository and Administrative Record. The IRP Phase I Records Search was published in January 1982. It initially identified 54 potential disposal sites (3 munitions disposal sites, 13 landfills, 13 miscellaneous dump or burial areas, and 25 liquid disposal/spill areas). Of these sites, 25 were recommended for further evaluation. Three primary areas of concern were identified: the Industrial Storm Drain, the Northeast Disposal Area, and the Southeast Disposal Area.

Several field studies have since been performed to determine the existence, nature, and extent of any new and existing contaminated sites on base; these additional studies have further identified two more primary areas of concern, the Central Disposal Area and the West Perimeter Disposal Area. To date, 65 sites have been identified (see Figure 3.3-1) under the FFA for inclusion in the remediation process. The initial sources of contamination at the IRP sites were primarily the maintenance and refueling of aircraft and ground support equipment, fire protection training, corrosion control, and past disposal actions. The most prevalent contaminants that have been identified include solvents and petroleum products. Other contaminants found or thought to exist in small quantities include radioactive materials (vacuum tubes), munitions (rifle cartridges and flares), acids, asbestos, pesticides, and various other shop and household wastes. A summary of site descriptions, including locations and wastes is provided in Table 3.3-2. Additional IRP information is available at Public Information File Locations at San Bernardino County Libraries (Adelanto and Victorville Branches).

For ease of discussion, most IRP sites are grouped into the aforementioned five geographic areas on the base, as follows (Figure 3.3-2): the Northeast Disposal Area, the Industrial Storm Drain Disposal Area, the Southeast Disposal Area, the Central Disposal Area, and the West Perimeter Disposal Area. IRP sites within each geographic area are described in Sections 3.3.3.1 through 3.3.3.5. IRP sites not incorporated into one of these five areas are discussed in Section 3.3.3.6. The following sections discuss individual sites based upon varying status of investigative studies and availability of results (i.e., various phases of

Table 3.3-2. Waste Sites and Disposal Area Investigations
Page 1 of 6

Site*	Site Description/Name	Location and Waste Description	Operable Unit No.
Northeast Disposal Area			
DP-02 (B-8)	Pesticide and Paint Burial	East of alert hangar and within landfill LF-14. Unverified DDT, copper sulfate, leaded paint.	3
DP-03 (B-9)	Acid and Oil Burial	North of northeast end of Runway 03. Unverified HCL, H_2SO_4, oil, fuel and unidentified drum burial.	3
DP-04 (B-10)	Pesticide and Waste Oil Burial	Northeast of northeast end of Runway 03. Unverified pesticides and waste oil.	3
DP-46 (B-11)	F-111 Aircraft Burial	Southeast of STP percolation ponds. An F-111 aircraft burial, no indication that aircraft contained hazardous materials.	3
DP-60 (S-24)	Sewage Sludge Disposal	Along industrial storm drain north of runway. Sewage sludge.	3
FT-19a (S-5)	Fire Training Area	At existing fire training area. North of crosswind runway. Burnt waste oils and fuels. 1969 to present.	3
FT-19b (S-5a)	Medical Waste Burn Site	South of STP percolation ponds. Medical waste and diesel fuel.	3
FT-20 (S-6)	Abandoned Fire Training	South of and possibly under the STP percolation ponds. Abandoned fire training area with burnt waste oil and fuel. DPDO storage yard with oil, asphalt and palliative spills. Early 1940's to 1970.	3
LF-13 (L-12)	Original Base Landfill	Under Building 761 (alert hangar) and apron. Non-salvageable materials (tools, POL, jeeps, scooters, war supplies after 1946). Incinerated ash from all base trash burning prior to 1950. Miscellaneous dumping and burning until 1950s.	3
LF-14 (L-13)	Base Landfill/Fuel	East of the alert hangar. Wastes disposal included lube oils, paint, laquer, naphthalene, TCE, cleaning compounds, batteries and general refuse. 1970 to 1976.	3
LF-43 (B-5)	Rubble Disposal	Northeast of alert barn and north of site LF-14. Small rubble. Same site used for pesticide and oil disposal described under site DP-04.	3
LF-44 (B-6)	Miscellaneous Trash/Rubble Disposal	East of STP percolation ponds, adjacent to base boundary. Miscellaneous domestic trash and rubble in small area.	3
LF-45 (B-7)	Construction Demolition	Northeast of northeast end of Runway 03. Small construction demolition disposal area.	3

* Site numbers correspond to 1989 DOD System and site numbers in parentheses are former DOD nomenclature.

Table 3.3-2. Waste Sites and Disposal Area Investigations
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Site*	Site Description/Name	Location and Waste Description	Operable Unit No.
SD-41 (B-3)	Riprap for Industrial Drain Discharge Gully	Along the industrial drain discharge gully. Riprap materials from small empty cans and construction rubble.	3
SS-53 (S-10)	Jet Fuel Spill	East of missile maintenance area. Jet fuel spill-quantity unknown.	3
WP-26 (S-21)	Sewage Treatment Plant Percolation Ponds	South of alert hangar. STP percolation ponds for sanitary wastes. Waste oils and solvents enter sanitary system. An abandoned fire training area may underlie ponds.	1
WP-29 (S-25)	Sludge Drying Beds	Next to STP. Sludge drying beds for sanitary and industrial primary sludges from residential and shop discharges to sewer. Operations ceased mid-1970's	3
WP-32 (S-2)	Leach Field	Near alert hangar. Leach field-sanitary wastes, aircraft maintenance.	3
—	TCE Plume	Northeast Disposal Area. TCE contamination (plume) in groundwater.	1
Industrial Storm Drain Area			
SD-25 (S-20)	Industrial Outfall and Pipeline	At northeast corner of the base. Industrial/storm water outfall gully with waste oils, fuels, solvents, paint strippers. STP percolation ponds located here in 1940s.	1
Southeast Disposal Area			
DP-10 (L-4)	Landfill Cartridges	South site of RW-09. Jet engine starter cartridges.	3
DP-15 (M-2)	Munitions/Oil	North of TEL disposal site, south of Air Base Road. Trench (225' x 60' x 10') with small arms munitions residues. Auto hobby shop waste oils possible also.	3
DP-33 (M-1)	Munitions	East of former grenade range near abandoned small arms range. 20 mm cartridges and grenade debris. Concrete-lined burn pit with paint cans. Unverified TNT & nitroglycerine burial near the burn pit.	3
DP-34 (M-3)	Munitions/Bombs	Burial area 50' by 50', south of abandoned small arms range. Burned practice bombs and small arms cartridges.	3

* Site numbers correspond to 1989 DOD System and site numbers in parentheses are former DOD nomenclature.

Table 3.3-2. Waste Sites and Disposal Area Investigations
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Site*	Site Description/Name	Location and Waste Description	Operable Unit No.
LF-07 (L-1)	Base Landfill	South of Air Base Road adjacent to abandoned small arms range. Lube oil, paint, lacquer, naphthalene, PD-680, TCE, cleaning compounds, hydraulic fluid, firefighting foam, batteries, oil spill absorbent, and general refuse disposal. Unverified barrels of acetone in southeast corner. Waste oil and fuel were used to burn materials in landfill. Landfill used from 1957 to 1970.	3
LF-08 (L-2)	Tetraethyl Lead Disposal	Within west boundary of LF-07. Bottoms from leaded, JP-4 fuel tanks and leaded fuel tank sludge. Possible trench (200' x 15' x 20') for JP-4 tank sludge in 1966.	3
LF-11 (L-5)	Landfill-Paper	Southwest of site LF-07. Privacy Act landfill with unburned paper.	3
RW-09 (L-3)	Low Level Radioactive Disposal	Directly west of site LF-08. Unverified low-level radioactive wastes (vacuum tubes and instrument panels). Possible toxic chemicals.	3
SS-52 (S-9)	Creosote Spill Area	Near munitions disposal area south of abandoned small arms range. Possible creosote spills.	3
WP-40 (B-1)	Chemical Toilet Sludge	Southeast of abandoned small arms range. Chemical toilet sludge.	3
Central Disposal Area			
DP-01 (B-2)	Paint Drum Burial	East of existing skeet range, adjacent to Air Base Road. 400 gallons of leaded paint in 1952.	3
DP-47 (B-12)	Aircraft Parts Burial	Northwest of Building 540 possibly in old salvage yard area. Miscellaneous airplane parts.	3
OT-48 (B-13)	Old Salvage Yard	East of Buildings 539-540. The salvage yard since 1950. Possible munitions burial.	3
SD-27 (S-22)	French Drain	Next to Building 555. Brick-lined drywell (30' x 4' diameter) for equipment POL disposal. Abandoned in 1987.	3
SS-23 (S-18)	Salvage Yard Liquids Spill	At salvage yard. Small spills of solvents, waste oils, other liquids.	3
SS-24 (S-19)	Transformer Storage	Near Building 560. Temporary storage area-unserviceable transformers. Minor leaks of oils from transformers.	3

* Site numbers correspond to 1989 DOD System and site numbers in parentheses are former DOD nomenclature.

Table 3.3-2. Waste Sites and Disposal Area Investigations
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Site*	Site Description/Name	Location and Waste Description	Operable Unit No.
SS-30	JP-4 Plume/Center of Base	Fuel related contamination in soils and groundwater.	2
WP-16 (S-1)	POL Leach Field	West of Building 605. Leach field-waste POL (trucks).	3
West Perimeter Disposal Area			
SD-18 (S-4)	Waste Jet Fuel Disposal	On Perimeter Road near engine test cells, off northwest end of abandoned runway. Waste jet fuel dumped on surface from bowsers, during 1965 and 1966.	3
Other Waste Sites and Disposal Areas			
LF-12 (L-11)	Street Sweepings Disposal	North of the residential area. Street sweepings. Possible trash and rubble 1960s, 1970s. All base waste from 1953 to 1957, like wastes at LF-07, with possible burning using waste oil in 1950s.	3
LF-35 (L-6)	Wood/Debris Disposal	South of Perimeter Road, northwest of existing skeet range. Wooden timbers and other debris. Possible barracks demolition (asbestos and fiberglass).	3
LF-36 (L-7)	Construction Debris/Borrow Pit	South of Perimeter Road in line with southwest end of Runway 21. Borrow pit filled with construction debris (pavement, rock).	3
LF-37 (L-8)	Road Materials Burial	West of Perimeter Road and the southwest end of Runway 21. Concrete, asphalt and rubble. Unverified disposal of aircraft parts and trash in 1940s.	3
LF-38 (L-9)	Trash Disposal	East of Building 806, north of LF-37. Miscellaneous trash disposal.	3
LF-39 (L-10)	Construction Debris/Trash	Under northern and eastern parts of residential area. Construction debris and rubble. Trash dumping and burning in 1950s, debris removal in 1970s.	3
OT-22 (S-12)	Golf Course	At golf course. Sewage treatment plant percolation pond effluent. Occured between 1965 and 1980.	3
OT-49 (B-A)	Aircraft Crash Residue	Parts from 10 aircraft crashes over a widespread area.	3
OT-50 (B-B)	Earth Embankment for Firing Line	Abandoned runway. Spent firearms and munition waste.	3
OT-51 (S-8)	Test Cell 799	Ne[illegible]gine test cell 799. Periodic jet fuel spills. 8,000 gallons jet fuel spill o[illegible]d in early 1950's.	3

* Site numbers correspond to 1989 DOD System and site numbers in parentheses are former DOD nomenclature.

Table 3.3-2. Waste Sites and Disposal Area Investigations
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Site*	Site Description/Name	Location and Waste Description	Operable Unit No.
OT-61 (S-A)	Shop Waste	Undocumented locations. Miscellaneous shop wastes including TCE.	3
OT-62 (S-B)	Rinse Water	Undocumented locations. Pesticide containers rinsate water.	3
OT-64 (S-D)	Transformer Malfunction Sites	Various (< 10) transformers. Small amounts of PCB containing transformer oils.	3
OT-65 (S-E)	Outlying Revetments	Possibly all outlying revetments. Revetments used as storage areas and engine test cells. Miscellaneous spills.	
OT-66 (NPSR)	Non-Point Source Residential Housing	Central east part of base in housing area. Roadway and surface runoff from area.	3
SD-28 (S-23)	Drain Pit/Dry Wall	Next to Building 559. Abandoned drain pit/dry well-jet fuel disposal, occured in an unpaved area from 1950 to 1977.	3
SD-42 (B-4)	Riprap for Off-base Water Supply	At the off-base water supply wells 5, 6, 7. Riprap materials from small empty cans and construction rubble.	3
SS-21 (S-7)	Tip Tank Drainage Area	South of Building 685, next to apron. Wing tip fuel drainage occured in an unpaid area from 1950 to 1977.	3
SS-55 (S-13)	Fuel Spill Collection Point	Near intersection of Phantom, Desert Streets. Accumulation point for jet fuel accidentally discharged in 1980.	3
SS-58 (S-16)	Leaded Gasoline Spill	Near Building 690. Leaded gasoline spills prior to mid-1950s.	2
SS-59 (S-17)	Fuel Spill	Near engine test cell 819. 8,000 gallon jet fuel spill in 1950s.	3
ST-54 (S-11)	Pipeline Leak	Near Building 708. Jet fuel pipeline leak-quantity unknown, occured in 1980.	3
ST-56 (S-14)	Jet Fuel Pipeline Leak	Near POL bulk fuel storage at Building 549. Possible 36,000 gallon jet fuel pipeline leak (Estimated < 1,000 gallons)	3
ST-57 (S-15)	Faulty Construction Leak	Southwest end of operational apron. Jet fuel leaks at hydrants.	3

* Site numbers correspond to 1989 DOD System and site numbers in parentheses are former DOD nomenclature.

Table 3.3-2. Waste Sites and Disposal Area Investigations
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Site*	Site Description/Name	Location and Waste Description	Operable Unit No.
ST-67 (LFDS)	Liquid Fuel Distribution System	About 25,000' of 8," 10" steel pipe from the operational apron south to the termination at ST-56.	2
WP-11 (S-3)	POL Leach field	Near Buildings 552 and 551. Leach field-waste POL (vehicles), fuels lab.	3
WP-63 (S-C)	Sewage Sludge	Perimeter Road and undocumented locations. Sewer sludge.	3

* *Site numbers correspond to 1989 DOD System and site numbers in parentheses are former DOD nomenclature.*

IRP have been completed, are currently under way, or are planned for the future).

In addition to the mandates of the IRP, prior to the transfer of any property at George AFB, the Air Force must also comply with the provisions of CERCLA § 120. CERCLA § 120h specifically requires that, before federal property can be transferred from federal ownership, the United States must provide notice of specific hazardous waste activities on the property and include in the deed a covenant warranting that "all remedial action necessary to protect human health and the environment with respect to any [hazardous] substance remaining on the property has been taken before the date of such transfer." Furthermore, the covenant must also warrant that "any additional remedial action found to be necessary after the date of such transfer shall be conducted by the United States." To ensure that money is available to conduct environmental restoration at military installations scheduled for closure, Congress appropriated $100 million to the Defense Base Closure Account for fiscal year 1991 to be used exclusively for that purpose. It is expected that future authorization acts will continue to fund environmental restoration activities at closing installations. In light of the continuing responsibility of the Air Force for restoration activities at George AFB, it is unlikely that such activities would be eligible for federal funding under the Airport Improvement Program managed by the FAA.

The combination of the requirements on the Air Force to complete the IRP for the contaminated sites on George AFB and provide the assurances required by CERCLA's 120(h) for all properties transferred may delay parcel disposition or conveyance and affect reuse.

The Air Force is committed to the identification, assessment, and remediation of the contamination from hazardous substances at George AFB. This commitment will assure the protection of public health as well as restoration of the environment. Additionally, the Air Force will work aggressively with the regulatory community to ensure that parcel disposition or conveyance occurs at the earliest reasonable date so as not to impede the economic redevelopment of the area through reuse of George AFB. Quantification of those delays based on the conceptual plans for all redevelopment alternatives and what is currently known at this stage of the IRP is not possible.

3.3.3.1 Northeast Disposal Area. The Northeast Disposal Area comprises approximately 730 acres. The IRP Phase I Records Search (CH2M Hill, 1982) identified waste disposal sites in this area, consisting of burial sites, landfills, fire training areas, and spill or liquid disposal sites, which could contain wastes with potentially hazardous characteristics. Additionally, an industrial and stormwater sewer from the flightline, another potential source of contamination, runs through the area. A groundwater monitoring well was installed during the Phase II, (Stage 1) Confirmation/Quantification Study, in 1985. Quarterly sampling revealed TCE contamination within the Northeast Disposal Area during

January 1986. A cleanup and abatement order was issued by the California Water Quality Control Board, Lahontan Region, on January 16, 1986. This order required the base to investigate the extent of the groundwater contamination and initiate the cleanup of TCE in the groundwater. This order was rescinded upon signature of the FFA.

As part of the Phase II (Stage 2) Confirmation/Quantification Study (1986), the Air Force installed 44 groundwater monitoring wells in the area in order to determine the nature and extent of any groundwater contamination. TCE contamination has been detected at least once in 42 of those wells in past sampling, with 12 wells showing TCE concentrations above the California State Action Level of 5 parts per billion (ppb). The field investigations have shown the area of contamination to be approximately 1.25 miles long by 0.75 mile wide, extending 0.75 mile north of the base boundary (Figure 3.3-2). In addition to TCE, benzene and 1,2-dichloroethane were detected in a few wells at levels exceeding state drinking water standards. Other volatile organic compounds (VOCs) have also been detected, but below State Action Level concentrations.

As a result of a Phase IV Feasibility Study, the Air Force has designed and constructed an Upper Aquifer remediation facility for groundwater contamination from the Northeast Disposal Area. Remediation would involve extracting contaminated groundwater from both on-base and off-base wells, removing the TCE and other VOCs by use of air stripping towers, and recharging the treated water through the existing abandoned wastewater treatment percolation ponds. The pump-and-treat system is currently being tested, and the Air Force is preparing for full operations. The system will treat approximately 750,000 gallons per day once operational. A cleanup using this system would be anticipated to last from 15 to 30 years. However, the system is not supported by a final cleanup decision under the FFA at this time. The Air Force is continuing the RI/FS under the FFA which will culminate in a Proposed Plan. The Proposed Plan will be distributed for public review and comment prior to the Air Force's submittal to the EPA Region IX and state of California of an ROD which will specify the exact scope of the final RA to be taken and cleanup objectives to be met.

The Fire Fighting Training Facility (Site FT-19), also located within the Northeast Disposal Area, consists of a 100-foot diameter concrete pad, an oil/water separator to separate fuel components from wastewater, and an evaporation tank to evaporate residual contaminated water. These facilities were refurbished in 1987. Prior to this upgrade, fuel for the training fires was sprayed directly on an asphalt pad, which had severely degraded and did not contain the fuel as required. The underlying soils are contaminated with fuel components and must be cleaned up.

Activities in the Northeast Disposal Area are designed to clean up groundwater contamination and define and clean up soil contamination associated with the

various sites. The method chosen for the cleanup of contaminated soils has not been finalized.

3.3.3.2 Industrial Storm Drain Disposal Area. The Industrial Storm Drain Disposal area consists of the industrial storm drain and outfall ditch site, which has been in operation since the early 1940s. In the past, the storm drain received industrial wastes, including waste oils, fuels, solvents, and paint strippers, as well as storm water. In 1983, the industrial sources were disconnected from the storm drain system and connected to the sanitary sewer system. The storm drain consisted of over 3.5 miles of piping in two parallel sections, the East Storm Drain and the West Storm Drain.

A segment of the East Storm Drain was constructed of perforated corrugated metal pipe. The main flow was easterly to an oil/water separator. Under normal flow conditions, the discharge continued easterly from the separator and was pumped into the sanitary sewer system. The primary contamination in the East Storm Drain was lead. The perforated corrugated piping was removed and replaced during 1990. The remaining segments of the East Storm Drain were jet steam cleaned. Currently, the East Storm Drain receives no industrial waste.

Some remedial activities for the West Storm Drain are currently under way. The remedial activities consist of the cleanup of contaminated areas associated with sections of perforated pipe, followed by closure in place of remaining sections. Cleanup activities on the West Storm Drain are on-going. This cleanup may not be the final cleanup of this area as the remediation activities are not supported by an ROD as the final RA. Additional study is ongoing and additional RA may be required.

3.3.3.3 Southeast Disposal Area. The Southeast Disposal Area contains ten IRP sites comprised of three munitions, five landfill, one liquid disposal or spill, and one burial site. Site RW-09 was identified as being used for the disposal of low-level radioactive wastes. The other landfills reportedly received a variety of wastes, including paper, general refuse, solvents, paints, and miscellaneous debris.

A water quality analysis, conducted at the Southeast Disposal Area, indicated the presence of radioactivity in the groundwater. The natural occurrence of radioactive material in rocks may provide sources for the introduction of radioactivity into the groundwater. Uranium materials oxidize readily, providing a source of soluble (hexavalent) uranium (JMM, 1988b). The levels detected in the groundwater are, thus, likely a result of natural occurrences in the area. These results will be substantiated during additional RI/FS work scheduled for this area.

3.3.3.4 Central Disposal Area. Investigations of the Central Disposal Area have been conducted since 1982. Ongoing investigations at the Central

Disposal Area consist of annual sampling and measurements of water levels in monitoring wells. The Central Disposal Area has seven waste disposal sites comprised of three burial sites and four liquid disposal or spills sites. Site WP-11 contains fuel-related hydrocarbons, such as petroleum, oil, and lubricant (POL) waste generated from vehicle maintenance and the fuels laboratory. Several years will be required to complete this cleanup, which has not yet begun.

The Hazardous Waste Storage Yard (Site SS-23) will close in compliance with RCRA and CCR, Title 22 (U.S. Air Force, 1990f). Soil samples were taken as part of the RI effort. Sample results from these tests indicate that no significant contamination of the soils and groundwater associated with the Hazardous Waste Storage Yard has occurred. Additional sampling, as outlined in the closure requirements of the permit, will be performed. Any contamination that may be identified will be remediated by the Air Force.

3.3.3.5 West Perimeter Disposal Area. One IRP site (SD-18) comprises the West Perimeter Disposal Area. No soil contamination in excess of applicable regulatory standards was discovered in ten shallow soil borings adjacent to the site. Because there is no confirmed soil contamination, no further soil investigations in the West Perimeter Disposal Area will be performed. Groundwater conditions in the area have not been investigated.

3.3.3.6 Other Waste Sites and Disposal Areas. Many IRP sites at George AFB have not been investigated since their initial identification in 1982 because they were not considered to be a sufficient threat to human health and welfare to warrant further investigation. Sites OT-49, OT-50, OT-61, OT-62, OT-64, OT-65, OT-66, and WP-63 have not been delineated on Figure 3.3-1 but have been included on Table 3.3-2. These sites are not believed to be potential sources for contamination (i.e., relatively small quantities are involved). The Air Force will accomplish further investigation on 27 of these sites to confirm contamination or noncontamination. The appropriate regulatory officials will be consulted and a decision will be made as to whether remediation efforts are warranted and what methods of remediation will be adopted.

Further site characterization was conducted at Site SS-30 from May 22 to August 8, 1990. Field observations and analytical data indicate that fuel-related contamination is present in the soils and the groundwater. Several potential JP-4 leak sources may have contributed to the total vadose zone (unsaturated soil above ground water) and groundwater contamination identified at this site. A contaminated groundwater plume was detected and estimated to be approximately 300 feet long and 240 feet wide. The RA indicates that cleanup is required to preserve nearby groundwater resources (IT Corporation, 1990).

Closure Baseline. IRP clean up activities will continue well past the December 1992 closure date for George AFB. To help accelerate the clean-up process the IRP sites at George AFB have been placed in three operable units.

Sites designated to each operable unit were determined by common contamination type and geographical location. The sites associated with each operable unit are listed in Table 3.3.2. The DMT will oversee the coordination of the contractors and assure that U.S. and California EPA, RWQCB and local regulatory agency concerns are addressed pursuant to the FFA. The Air Force will retain easements in order to perform operations and maintenance on all remediation systems. Funding for the restoration activities at closure installations was authorized by Congress in 1991 specifically for that purpose. It is anticipated that future authorization acts will continue to fund environmental restoration activities at closing installations. The current schedule for future IRP activities is provided in Table 3.3-3. The deadlines are binding on the Air Force subject to compliance by the other FFA parties to the agreed review periods. The parties to the FFA may request extensions for good cause, for example, identification of significant new site conditions.

3.3.4 Storage Tanks

Regulations. USTs are subject to federal regulations within RCRA, 40 CFR Part 280. These regulations were mandated by the Hazardous and Solid Waste Amendments of 1984. The state of California has adopted regulations under Title 23, Chapter 3 of the CCRs. California regulations are more stringent than the federal regulations and require secondary containment on both the tank and piping systems installed after January 1, 1984. San Bernardino County DEHS administers the state regulations for USTs at George AFB.

Aboveground storage tanks are regulated under California Health and Safety Code, Division 20, Section 6.67, the Uniform Fire Code, and the National Fire Protection Association regulations, and are enforced by the base fire department.

Preclosure Reference. There are 47 UST systems at George AFB, listed in Table 3.3-4. The George AFB UST Management Plan dated September 1990 (Entech, Inc., 1990c) describes the number, types and status of USTs on the base.

There are three USTs designed in compliance with San Bernardino County's 1988 regulations (Table 3.3-4, Tank Nos. 749-1, 749-2, and 749-3). Periodic monitoring is accomplished through a county-approved tracer system.

There are five aboveground storage tanks (Table 3.3-5) for JP-4 fuel. This fuel is provided to the base through a liquid fuel pipeline system. The fuel is then transferred through the Liquid Fuel Distribution System (LFDS) to numerous aircraft refueling hydrants on the flightline. The LFDS has leak detection (soil-gas) monitoring, in compliance with San Bernardino County regulations.

Table 3.3-3. George AFB FFA Schedule as of November 19, 1991

Operable Unit Sites	Document Name	Final Deliverable Date
Base Comprehensive	Draft Community Relations Plan	January 10, 1991
	Draft Sampling and Analytical Plan	January 10, 1991
	Draft Work Plan	April 2, 1991
	Draft Remedial Investigation Report	October 15, 1993
	Draft Feasibility Study	June 15, 1994
	Draft Proposed Plan	June 15, 1994
	Draft Record of Decision	February 15, 1995
Operable Unit #1	Draft Supplemental RI/FS/Proposed Plan	February 7, 1992
	Draft Record of Decision	October 7, 1992
	Treatability Study Work Plan	August 15, 1991
	System Start Up	December 1, 1991
Operable Unit #2	Draft Work Plan/Sample and Analysis Plan/Health & Safety Plan	February 7, 1991
	Draft Remedial Investigation Report	June 6, 1992
	Draft Feasibility Study/Proposed Plan	June 6, 1992
	Draft Record of Decision	November 3, 1992
	Draft Engineering Evaluation/Cost Assessment (Pure Product Removal)	Sepember 2, 1991
	Commence Removal Action	March 1, 1992
Operable Unit #3	Draft Work Plan/Sample and Analysis Plan/Health & Safety Plan	January 2, 1992
	Draft Remedial Investigation Report	April 15, 1993
	Draft Feasibility Study/Proposed Plan	November 15, 1993
	Draft Record of Decision	July 15, 1994

Table 3.3-4. UST Inventory

Tank #	Capacity (gallons)	Contents	Installation Date	Construction Material
12-1	10,000	Unleaded gas	1966	Steel
12-2	9,950	Unleaded gas	1966	Steel
12-3	10,000	Unleaded gas	1966	Steel
12-4	1,000	Waste oil	1966	Steel
285	500	# 2 Diesel fuel	Unknown	Steel
550-T6	10,000	Unleaded gas	1971	Steel
550-T7	10,000	Unleaded gas	1971	Steel
550-T8	2,000	# 2 Diesel auto	1971	Steel
643-1	4,000	Unleaded gas	1983	Fiberglass
643-2	4,000	JP-4	1983	Fiberglass
643-3	4,000	JP-4	1983	Fiberglass
690-1	50,000	Contaminated JP-4	1948	Steel
690-2	50,000	$NaOH + H_2O$	1948	Steel
690-3	50,000	JP-4	1948	Steel
690-4	50,000	JP-4	1948	Steel
701	200	# 2 Diesel fuel	Unknown	Steel
708-1	50,000	JP-4	1951	Steel
708-2	50,000	JP-4	1951	Steel
708-3	50,000	JP-4	1951	Steel
708-4	50,000	JP-4	1951	Steel
708-5	50,000	JP-4	1951	Steel
708-6	50,000	JP-4	1951	Steel
710-1	1,250	# 2 Diesel fuel	1974	Steel
710-2	600	# 2 Diesel fuel	Unknown	Steel
724-1	1,000	Unleaded gas	Unknown	Steel
724-2	1,000	# 2 Diesel auto	Unknown	Steel
724-3	500	# 2 Diesel fuel	Unknown	Steel
730	500	# 2 Diesel fuel	Unknown	Steel
749-1	6,000	JP-4	Unknown	Fiberglass
749-2	1,000	Unleaded gas	Unknown	Fiberglass
749-3	6,000	JP-4	Unknown	Fiberglass
761-1	1,000	JP-4	1976	Steel
761-2	500	# 2 Diesel fuel	1978	Steel
806-1	1,000	# 2 Diesel fuel	Unknown	Steel
808	500	Waste fuel & H_20	Unknown	Steel
814	500	# 2 Diesel fuel	1967	Steel
819	500	Waste fuel & H_20	Unknown	Steel
841	600	# 2 Diesel fuel	Unknown	Steel
842	600	# 2 Diesel fuel	Unknown	Steel
1146	1,000	Unleaded gas	Unknown	Steel
1155-1	12,000	# 2 Diesel fuel	1983	Steel
1155-2	25,000	# 2 Heating fuel	1983	Steel
1200-2	600	# 2 Diesel fuel	Unknown	Steel
32000-1	5,000	JP-4	1951	Steel
32000-2	5,000	JP-4	1951	Steel
32000-3	5,000	JP-4	1951	Steel
32000-4	5,000	JP-4	1951	Steel

Table 3.3-5. Aboveground Storage Tank Inventory

Tank	Building #	Total Capacity (gallons)
1	547	420,000
2	548	209,000
3	554	630,000
4	556	668,000
5	557	419,000

Source: CH2M Hill, 1982.

Closure Baseline. All USTs not needed for future operations at the base will be removed. Remaining USTs must comply with all federal, state, and local regulations regarding system integrity, spill prevention, and liability insurance. Adequate preservation of the system, including draining and purging flammable gases, may be necessary to minimize the risk of accidental ignition or explosion from aboveground tanks. Abandonment and temporary closure of both underground and aboveground storage tanks will be closely coordinated with the San Bernardino County DEHS.

3.3.5 Asbestos

Regulations. Asbestos is regulated by EPA and OSHA. Asbestos emissions into ambient air are controlled according to Section 112 of the Clean Air Act, which establishes the National Emissions Standards for Hazardous Air Pollutants (NESHAP). The Asbestos Hazard Emergency Response Act (AHERA) addresses the management of asbestos in schools from kindergarten through grade 12. Asbestos may be released into the air during the renovation or demolition of buildings. Asbestos-containing material (ACM) that can crumble or break as a result of hand pressure is called friable asbestos. These fibers can be emitted from various building materials, such as pipe and boiler wrap, acoustic ceilings, and other insulating materials. NESHAP regulates the demolition or renovation of buildings with ACM. EPA has a policy that addresses leaving asbestos in place and not disturbing the material.

Preclosure Reference. The current Air Force practice is to remove or manage asbestos in active facilities only when it poses a threat of release from friable ACM. The Air Force policy concerning the management of asbestos for base closures can be found in Appendix H. George AFB has surveyed 184 of the 1,970 existing on-base facilities for asbestos; 40 percent contained ACM (U.S. Air Force, 1989c).

A base-wide survey for ACM is required by FPMR disclosure law prior to base disposal. Completion of the George AFB asbestos survey is anticipated in 1992. Once the survey is completed, an asbestos management plan will be developed

which will identify appropriate methods for minimizing the risks of exposure to asbestos in accordance with Air Force regulations.

Closure Baseline.

An analysis will be conducted to determine the cost effectiveness of removing ACM versus devaluing the property prior to reuse. ACM will be removed if a building is, or is intended to be, used as a school or child-care facility. Exposed friable asbestos will be removed in accordance with applicable health laws, regulations, and standards, if it is determined that a health hazard exists.

3.3.6 Pesticide and Herbicide Usage

Regulations. The federal regulations that control the use of pesticides and herbicides are contained within the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA), 40 CFR 162, 165, 166, 170 and 171. Implementation of the federal regulations by the state are found under Title 3, Chapter 4, of the CCRs.

Preclosure Reference. All of the pesticides, fungicides, and herbicides utilized at George AFB are stored in Buildings 513 (Pest Management) and 1138/1139 (Golf Course Management) (Table 3.3-6).

Closure Baseline. At the time of closure, pesticides and herbicides will continue to be utilized at the Pest Management and the golf course maintenance areas.

3.3.7 Polychlorinated Biphenyls (PCBs)

Commercial PCBs are industrial compounds produced by chlorination of biphenyls. PCBs persist in the environment, accumulate in organisms, and concentrate in the food chain. PCBs are used in electrical equipment, primarily in capacitors and transformers, because they are electrically nonconductive and stable at high temperatures.

Regulations. The disposal of these compounds is regulated under the federal Toxic Substances Control Act (TSCA), which banned the manufacture and distribution of PCBs with the exception of PCBs used in enclosed systems. By definition, PCB equipment contains 500 parts per million (ppm) PCBs or more, whereas PCB-contaminated equipment contains PCB concentrations greater than 50 ppm but less than 500 ppm, while PCB-items contain from 5 to 49 ppm PCBs. The U.S. EPA regulates the removal and disposal of all sources of PCBs containing 50 ppm or more; the regulations are more stringent for PCB equipment than for PCB-contaminated equipment. The state regulates the disposition of PCB-items.

Table 3.3-6. Pesticide/Fungicide/Herbicide Storage (Pest Management and Golf Course Management)

Name/Trade Name	Quantity
Pesticides	
Diazinon	1 gallon
Raygon (liquid)	1 gallon
Ficam W WP	1 gallon
Carbaryl	3 gallon
Fungicides	
None	
Herbicides	
Parmitol 25 E	25 gallons
Bronicil	4 gallons
Round-up (liquid)	5 gallons
Dalapon	50 pounds
Weed AR 2-4-D	5 gallons
Round-up glyphosate 41%	3 gallons
2-4 D	5 gallons
Cutrine plus-copper	4 gallons

Source: U.S. Air Force, 1990e.

California regulations under Title 22, Chapter 30 of the CCRs are more stringent than the federal TSCA regulations. Additional state regulations are found in the California Health and Safety Code, Chapter 6.5. Within California, fluids containing 5 ppm PCBs or more are regulated as a hazardous waste.

Preclosure Reference. There are six contaminated electrical devices at George AFB with PCB concentrations between 50 and 499 ppm. These six contaminated electrical devices will be removed prior to base closure. Additionally, there are 68 transformers that contain 5 to 49 ppm PCBs; these transformers will remain in place and their locations will be disclosed to the new owners.

Closure Baseline. There will be no federally regulated PCB-contaminated equipment on base at closure. PCB items (the 68 items with 5 to 49 ppm of PCBs) will remain in place and the new owners will be informed of their existance and locations. PCB items remaining after base closure will be managed in compliance with state regulations.

3.3.8 Radon

Radon is a naturally occurring colorless and odorless radioactive gas that is produced by radioactive decay of naturally occurring uranium. Radium, of which radon gas is a by-product, is found in high concentration in rocks

containing uranium, granite, shale, phosphate, and pitchblende. Atmospheric radon is diluted to insignificant concentrations. Radon that is present in soil, however, can enter a building through small spaces and openings, accumulating in enclosed areas, such as basements. The cancer risk caused by exposure, through the inhalation of radon, is currently a topic of concern.

Regulations. There are no federal or state standards regulating radon exposure at the present time. U.S. Air Force policy requires implementation of the Air Force Radon Assessment and Mitigation Program (RAMP) to determine levels of radon exposure of military personnel and their dependents. EPA has made testing recommendations for both residential structures and schools. For residential structures, using a 2- to 7-day charcoal canister test, a level between 4 and 20 picocuries per liter (pCi/l) should lead to additional screening within a few years. For levels of 20 to 200 pCi/l, additional confirmation sampling should be accomplished within a few months. If there is an excess of 200 pCi/l, the structure should be immediately evacuated. Schools are to use a 2-day charcoal canister; readings of 4 to 20 pCi/l require a 9-month school year survey. Table 3.3-7 summarizes the recommended radon surveys and action levels.

Table 3.3-7. Recommended Radon Surveys and Mitigations

Facility	EPA Action Level	Recommendation
Residential	4 to 20 pCi/l	Additional screening. Expose detector for 1 year. Reduce levels to below 4 pCi/l within a few years.
Residential	20 to 200 pCi/l	Perform follow-up measurements. Expose detectors for no more than 3 months.
Residential	Above 200 pCi/l	Perform follow-up measurements. Expose detectors for no more than one week. Immediately reduce radon levels.
	Two-Day Weekend Measurement	
School	4 to 20 pCi/l	Confirmatory 9-month survey. Alpha track or ion chamber survey.
School	Greater than 20 pCi/l	Diagnostic survey or mitigation.

Congress has set a national goal for indoor radon concentration of the outdoor ambient levels of from 0.2 to 0.7 pCi/l.
Source: U.S. EPA, 1988.

Preclosure Reference. With the development of RAMP, the Air Force is now able to evaluate the concentration of radon in family housing units on military installations. If high concentrations of radon are detected, venting the gas is implemented according to RAMP recommendations. The initial radon screening

survey at George AFB was conducted by the Bioenvironmental Engineering Division and consisted of 30 samples taken from military family housing units between December 1987 and February 1988. All survey results were below EPA's recommended mitigation level of 4 pCi/l, thus, no further actions were deemed necessary (U.S. Air Force, 1989c).

Closure Baseline. Based on the survey results, no further action is necessary.

3.3.9 Medical/Biohazardous Waste

Regulations. Current federal standards do not require regulation of medical waste; Title 22, Article 13 of the CCRs regulates infectious wastes. Section 66845 offers four methods for treatment and disposal of such wastes:

- Incineration in a controlled-air multi-chambered incinerator which provides complete combustion of the waste to carbonized or mineralized ash, rendering infectious waste, non-infectious and disposable as non-hazardous waste
- Burial at a Class I or Class II landfill
- Discharge to sewage system if the waste is liquid or semiliquid
- Sterilization by heating in a steam sterilizer or other sterilization technique approved by the DHS, so it is rendered noninfectious.

Preclosure Reference. George AFB has a 25-bed hospital that provides basic in- and out-patient care. All medical wastes and other contaminated materials are incinerated by a hospital pathological incinerator with secondary combustion for air pollution control. The incinerator is permitted by the San Bernardino County Air Pollution Control District. The hospital generated 12,700 pounds of waste in 1990. The base hospital laboratory autoclaves all biohazardous waste prior to disposal (Rodriguez, 1991).

A number of photographic operations currently exist at George AFB. Table 3.3-8 lists the silver recovery units which treat photochemical wastes prior to discharge to the sewage system.

Table 3.3-8. Silver Recovery Units

Source	Building No.
Armament Recording Laboratory	107
Base Photo Laboratory	350
Dental X-Ray Processing	1150
Medical X-Ray Processing	1155
Non-Destructive Aircraft Maintenance Shop	564

Closure Baseline. The hospital will be inactive and no biohazardous waste will be generated at base closure. Existing biohazardous and photochemical waste will be processed and removed prior to closure.

3.4 NATURAL ENVIRONMENT

This section describes the affected environment for natural resources: soils and geology, water resources, air quality, noise, biological resources, and cultural resources.

3.4.1 Soils and Geology

The ROI for soils is localized and limited to George AFB. For geology, the ROI extends to neighboring aggregate deposits northeast of George AFB and the general tectonic framework that encompasses the Mojave Desert.

3.4.1.1 Soils. In general, soils at George AFB have formed on alluvial fan deposits from the nearby mountains. Soils generally consist of sand and loamy sand with little clay. The formation of caliche layers in older soils hampers direct infiltration of precipitation by acting as a partial barrier. The extent to which caliche layers occur is dependent on weathering and degree of erosion loamy sand with little clay. The formation of caliche layers in older soils hampers direct infiltration of precipitation by acting as a partial barrier. The extent to which caliche layers occur is dependent on weathering and degree of erosion.

"Desert pavement" is a term often used to describe the overall surface soil condition in the ROI. Characteristics of desert pavement include thin, residual concentrations of wind-polished pebbles (SAIC, 1985). In areas where the topography slopes, the pavement impedes infiltration and promotes sheet flow and gully erosion. The potential for sediment transfer by water or wind erosion differs among soil types and is dependent upon slope and whether or not the desert pavement acts as a protective cover.

The Soil Conservation Service (U.S. Department of Agriculture, 1986) has mapped soils on and around George AFB. Most of the on-base soils consist of the Bryman loamy fine sand that forms on terraces and older alluvial deposits. This fine sand is susceptible to high wind erosion in unprotected areas, although water erosion has a slight impact. The shrink-swell potential is moderate and the overall strength is low. Typically, the surface layer consists of pale brown and light yellow loam with fine sand. The Bryman loamy fine sand, when irrigated, meets the soil requirements for prime farmland; however, the area surrounding the base is not irrigated and, thus, the land does not qualify as prime farmland (see AD Form 1006, Appendix I).

Another common soil unit in the ROI is the Mojave Variant loamy sand. The permeability of this unit is moderately low and runoff is medium. The soil is

susceptible to slight water erosion, but has a high potential for wind erosion in unprotected areas. Surface layers consist of light brown, loamy sand underlain by a reddish-pink subsoil.

The eastern section of the ROI, near the Mojave River, contains a wider variety of soils. The Haplargids-Calciorthid Complex occurs mainly between flood plains of the Mojave River, on terrace escarpments, and on narrow alluvial fans and drainageways. The permeability of these soils is moderately low and the hazard of water erosion is moderately high. Wind erosion is moderate in unprotected areas.

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Contamination was identified in soil samples collected along the east edge of the flight line apron (IT Corporation, 1990). Contaminants and concentrations are identified in Section 3.3, Hazardous Materials/Hazardous Waste Management.

3.4.1.2 Physiography and Geology. George AFB is situated in the Mojave Desert region of the Basin and Range Physiographic Province. The desert is bounded on the north and northwest by the Garlock Fault and Tehachapi Mountains and by the San Gabriel and San Bernardino mountains to the south. Characteristic landforms of the region include alluvial fans, stream terraces, and playas. General elevations in the Mojave Desert range from 4,000 feet MSL in the mountain ranges to around 2,000 feet MSL in some of the dry lake basins. The surface elevation of George AFB is approximately 2,900 feet MSL. Several faults are present in the region. Locally, the base lies in a wedge-shaped tectonic section that is underlain by geologic units ranging from Precambrian to Recent in age (Bortugno and Spittler, 1986).

George AFB is located on an extension of the Victorville Fan, which originates at the base of the San Gabriel Mountains and extends northward to the Mojave River (Montgomery, 1988a). Surficial units at George AFB consist of alluvial deposits originating from nearby mountains during the past million years (SAIC, 1985). Stream deposits, erosion, and other weathering factors have modified the alluvial fans to form their present land surface.

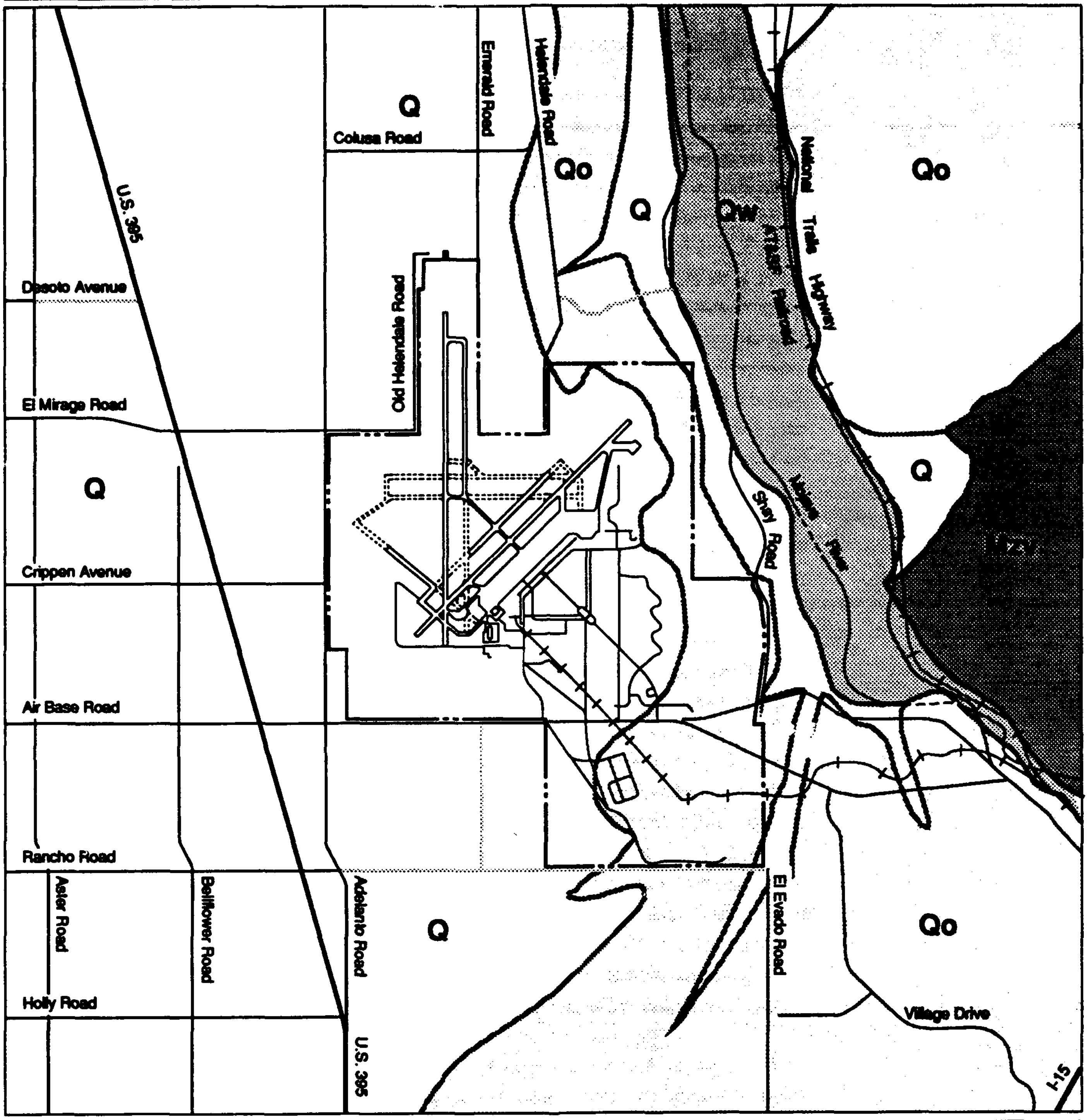
Geologic units exposed in the region are generally grouped into consolidated rocks and unconsolidated deposits (Bader et al., 1958). Consolidated rocks of

Tertiary age consist of coarse, conglomeratic sandstones that have poor permeability and water-bearing characteristics. Unconsolidated deposits, which comprise most of the desert floor, are of Quaternary age. These deposits are composed of materials ranging in size from coarse sands and gravels to silts and clays. These units are typically permeable, porous, and have good water-bearing characteristics (Bader et al., 1958).

The older, consolidated deposits (Harold and Shoemaker formation) are underlain by a basement complex of nonwater-bearing igneous and metamorphic rocks. The basement rock is well-exposed in the San Gabriel Mountain range but becomes less evident north of the range. The units are also exposed in the isolated mountain ranges northeast of the base. Drilling records indicate that the basement complex is approximately 600 feet below ground surface on base (Montgomery, 1988b). The Paleozoic-Mesozoic basement complex consists primarily of quartz monzonite and metamorphosed marine sediments, commonly occurring with quartz and microcline in granite pegmatites (Figure 3.4-1).

Mineral and Natural Resources. The diverse topography and geologic features associated with the Mojave Desert region yield numerous mineral and natural resources. Scattered localities near the base have extracted minerals including gold, silver, iron, tungsten, turquoise, zeolite, barite, copper, and clay. Currently, limestone is mined in the mountains northeast and southeast of the base. Sand and gravel are mined from alluvial fans and stream deposits near the base for use in the construction industry. Approximately 125 tons of sand and gravel per hour were being excavated from deposits located within 5 miles of the base in the 1960s (Goldman, 1968).

Seismicity. George AFB is on a down-dropped block (Mojave Block) bounded by the San Andreas and Garlock faults, both of which have mainly horizontal movement. Within the Mojave Block, numerous potentially active faults parallel the San Andreas Fault. The Helendale Fault, approximately 10 miles east of the base, has had movement within the last 11,000 years and is among the many active faults found within the region. Most of the faults trend in a northwest-southeast direction. Most faults in the ROI cut Quaternary age formations and are considered potentially active (Montgomery, 1988b). The ROI is located in Seismic Zone 4 (International Conference of Building Officials, 1985). The 1982 building code for on-base structures is determined by the proximity to main fault systems. Seismic Zone 4 is characterized by areas likely to sustain major damage from earthquakes, and corresponds to intensities of VIII or higher on the Modified Mercalli Scale. There is no known liquefaction potential on the installation; however, Davis et al. (1982) indicate that the airfield and surrounding region could experience very strong shocks, with damage such as falling chimneys and cracks in walls of ordinary masonry structures from an 8.3 magnitude earthquake along the southern San Andreas Fault.



EXPLANATION

Q	Alluvium (Recent)
Qo	Older Alluvium
Qw	Wash Deposits
Mzq	Quartz Monzonite (Basement Complex)

Glacial Till Unit Boundary

- - - - Base Boundary

==== Abandoned Runway

0 1/4 1/2 1 Mile

Source: California Divison of Mines and Geology, San Bernardino Quadrangle 1:250,000; 1983.

Regional Geological Map

Figure 3.4-1

3.4.2 Water Resources

The surface and groundwater ROI generally extends beyond the base boundary, encompassing areas that would be affected by changes in resource usage. The ROI for groundwater includes all of the Upper Mojave River Basin from Helendale south to the San Bernardino Mountains. There are no coastal areas or wild and scenic rivers in the ROI.

3.4.2.1 Surface Water. No perennial or intermittent streams occur on base. A small man-made pond is located on the base golf course. On-base runoff normally collects in slight topographic lows or along streets during intense storms because the capacity of storm drains and collection systems is limited. Surface runoff travels north and northeast along the airfield area and generally east toward the Mojave River in the main cantonment area. The nearest 100-year floodplain is in the Mojave River, which lies outside of, but adjacent the northeastern portion of the base boundary.

The principal Mojave River drainage basin covers an area of over 3,000 square miles (Subsurface Surveys, Inc., 1990) in the south-central portion of the Mojave Desert. The river channel is about 125 miles long, has a gradient of approximately 19 feet per mile, and is located approximately one-quarter mile east of the base (Montgomery, 1988b). The Mojave River acts as the principal source of recharge to the Upper Mojave River Groundwater Basin. Watersheds in the mountain ranges south of the base contribute to the majority of the Mojave River's stream flow. Heavy precipitation is the principal source of surface water and is responsible for the formation of gullies and channels tributary to the Mojave River. Surface flow (perennial) in the Mojave River stream bed is observed at the Forks, the Upper and Lower Narrows near Victorville, Camp Cady, and Afton. Perennial flow at the Forks originates from the drainage area of Deep Creek; during dry periods, no surface flow occurs. Between the Upper and Lower Narrows in Victorville, surface flow is generated from groundwater aquifer constrictions and causes groundwater exposure at the surface, as perennial surface flow in the Mojave River Channel.

Surface Water Quality. The quality of surface water storm flow from the Mojave River is generally good. Tests indicate that the water contains less than 400 ppm of total dissolved solids (tds) (CH2M Hill, 1982). Surface runoff from the base has not been tested and, thus, no conclusions can be made on the quality or the degree of contamination (Montgomery, 1988b).

3.4.2.2 Surface Drainage. On-base surface flow generally runs north and northeast along the airfield and east towards the Mojave River in the area of the main cantonment. The on-base storm drain system consists of pipes ranging in size from 12 to 60 inches (CH2M Hill, 1982). The drainage system capacity is limited and, during periods of heavy precipitation, localized flooding occurs, especially in the main cantonment and base housing areas (San Bernardino

County, 1990a). Runoff water along the eastern section of the base is transported through street gutters and pipelines to an outfall ditch that eventually flows to the Mojave River. Most of the runway and taxiway surface flow is collected by inlets and conveyed in piping to an outfall ditch that runs parallel to the eastern base boundary. All water from base storm drainage flows into the Mojave River. Runoff from the western portion of the base is directed northeast and eventually flows into the Mojave River north of the base. Runoff from the flightline, industrial, and office areas is directed in a northern and eastern direction (CH2M Hill, 1982.) Because of high evaporation and percolation rates associated with the surrounding soils, runoff from normal rainfall seldom reaches the Mojave River. However, during abnormally intense rainfall, localized flooding may occur and some runoff may reach the river. The base currently does not operate under a National Pollution Discharge Elimination System (NPDES) permit, but intends to apply for California's storm water general permit.

3.4.2.3 Groundwater. George AFB overlies the George subbasin of the Upper Mojave River Groundwater Basin (Subsurface Surveys, Inc., 1990). Groundwater under George AFB appears to be concentrated in two main zones. The shallowest zone of groundwater occurs under perched or unconfined conditions and is discontinuous across much of the base. The uppermost zone is termed the Upper Aquifer by Montgomery (1988b). The other occurrence of groundwater, referred to as the Regional Aquifer, is below the Upper Aquifer in a relatively permeable zone at an elevation approximately equal with the Mojave River alluvium. Principal recharge to the Regional Aquifer and to the Mojave River Groundwater Basins (Upper, Middle, and Lower) is primarily accomplished through Mojave River underflow (Murk, 1985). The Regional Aquifer is the zone from which the base and the city of Adelanto obtain their water.

Several studies have concluded that the Upper Mojave River Basin is in a state of overdraft (more water is pumped out than is replenished). Studies conducted by the California Department of Water Resources (CDWR)(1967) and Murk Engineers (1985) indicated that groundwater levels in the Upper Mojave River Basin declined more than 25 feet from 1958 to 1981. The water table in the Hesperia Water District dropped 33 feet from 1953 to 1989. Although overdraft is certain, the degree of overdraft throughout the basin has not been firmly established. Table 3.4-1 lists the estimated overdrafts reported by various investigators.

According to the CDWR (1967) and Bader (1958), the majority of the water wells in the Upper Mojave Basin produce from groundwater zones 200 to 600 feet below the ground surface. The total amount of groundwater stored in the upper 1,000 feet of the Upper Mojave Groundwater Basin is estimated to be about 41.5 million acre feet (Subsurface Surveys, Inc., 1990).

Table 3.4-1. Estimated Groundwater Overdrafts

Investigator(s)	Overdraft: Greater than	Overdraft: but less than
Murk Engineers (1985)	3,852	24,522 af/yr
California Polytechnic University (1987)	0	24,500 af/yr
CDWR (Bulletin 84) (1967)	0	13,400 af/yr
Mojave Water Agency* (1991)	12,000	30,000 af/yr
Stetson (1974)	22,000	30,000 af/yr

* Personal communication.
** af/yr = Acre feet/year.

Murk Engineers (1985) have completed the most detailed and recent investigation of groundwater conditions to date and their data conform to the average conditions reported by other investigators. Murk Engineers (1985) data have, thus, been used for this analysis.

According to Murk Engineers (1985), the Upper Mojave River Basin has the following characteristics:

- Safe Yield — 18,500 af/yr
- Overdraft (1981 use Conditions) — 26,500 af/yr
- Average Annual Overdraft (over 23-year period from 1958-1981) — 24,500 af/yr

Safe yield is defined as that quantity of water that can be withdrawn from the groundwater aquifer without impairing the aquifer as a water source. When groundwater is extracted (consumed) at a rate less than the safe yield, there is a net inflow to the basin (rising water table). When groundwater is extracted from the basin at a rate that exceeds the safe yield, the basin is considered in overdraft conditions.

Water demand (production) for the Upper Mojave Basin in 1990 was 124,100 af/yr (Pirnie, 1990). Projected water demand for the Upper Mojave Basin is estimated at 165,000 af/yr by the year 2010 (Pirnie, 1990). Because some of the groundwater withdrawn from the basin is returned through deep percolation due to irrigation, wastewater filtration plants, and lakes, the actual loss (through evaporation, etc.) of groundwater from the basin is assumed to be about 45 percent of production (Pirnie, 1990). Therefore, the annual average consumption (loss of water) for the Upper Mojave Basin was estimated to be about 53,800 af/yr in 1990 and is projected to be about 74,500 af/yr (about 45 percent of production) by 2010 (Pirnie, 1990). From a regional perspective, this increase in demand, combined with the current overdraft condition, requires decisions by local communities regarding additional water provisions for this region. The MWA, organized by the state in 1960, operates as a local contract agency to supply water to the Mojave Desert region through the State Water

Project (SWP). The MWA is one of 30 contractors in the state and, under its existing contract, has a maximum allocation of SWP water at a maximum of up to 50,800 af/yr for all regions under its jurisdiction. However, because the projected demand in 2010 is 165,000 af/yr, the MWA and other local water districts will have to identify additional sources of water to meet the increasing demand by the year 2010. Based on Pirnie (1990), water budget calculations estimated that the Upper Mojave Basin will have to import approximately 56,000 af/yr by the year 2010.

Lithologic logs and cross sections from past investigations characterize the Upper Aquifer as a heterogenous mixture of silt and sand. Groundwater in this aquifer migrates downward through a zone of low permeability. Tests performed on the Upper Aquifer indicate it has a moderately high average transmissivity of about 11,700 gallons per day per foot (gpd/ft) and a relatively low storage coefficient of about 2×10^{-4}. Data from numerous observation wells on base indicate the Upper Aquifer is discontinuous and pronounced vertical leakage into the Regional Aquifer was evident in tests conducted by Montgomery (1988b).

The Regional Aquifer occurs below elevations of about 2,600 feet MSL (300 to 450 feet below ground surface on the west side of the base, becoming shallower to the east). This aquifer consists of relatively coarse sands and gravels and is separated from the Upper Aquifer by intervals of low permeability clay. The zone is approximately 300 feet thick and water flows under the influence of horizontal gradients (Montgomery, 1988b). Test results indicate the Regional Aquifer has a moderately high average transmissivity of 53,900 to 60,500 gpd/ft and a relatively low storage coefficient of 5×10^{-3} (Montgomery, 1988b).

Borings drilled by Lee and Ro (1984) on George AFB indicated that the alluvial fan deposits beneath George AFB become increasingly porous west of the Mojave River. In general the aquifer characteristics are similar to those identified by Murk (1985) for the Upper Mojave River Basin. Lee and Ro (1984) indicated that the economical aquifers on base, with the best quality water, are present between depths of 300 and 450 feet below the ground surface.

Groundwater Quality. The mineralogical composition of groundwater within the ROI varies greatly and is dependent upon geologic conditions. The highest mineralization level is farthest from the source of recharge. The quality of groundwater has been investigated continuously since 1982. The most significant groundwater contamination in the ROI is the high TCE levels found within the Upper Aquifer in the Northeast Disposal Area on base. This aquifer is not a potable water source for the local area. However, it overlies the Regional Aquifer, which is the source of potable water for the base and surrounding communities and leakage from the Upper Aquifer to the Regional Aquifer is possible. The slowly moving plume has been identified near the northeast

corner of the base and currently extends off base. (San Bernardino County, 1990a). A pump-and-treat remediation system is currently in place and awaiting EPA approval to begin operations. (See Section 3.3 for detailed information concerning known contamination.)

3.4.3 Air Quality

Air quality in a given location is described as the concentration of various pollutants in the atmosphere, generally expressed in units of ppm or micrograms per cubic meter ($\mu g/m^3$). Air quality is determined by the type and amount of pollutants emitted into the atmosphere, the size and topography of the air basin, and the prevailing meteorological conditions. The significance of a pollutant concentration is determined by comparing it to federal and/or state ambient air quality standards. These standards represent the maximum allowable atmospheric concentrations that may occur and still protect public health and welfare, with a reasonable margin of safety. The federal standards are established by the U.S. EPA and termed the National Ambient Air Quality Standards (NAAQS). The state standards are established by the California Air Resources Board (ARB) and are termed the California Ambient Air Quality Standards (CAAQS). The NAAQS and CAAQS are presented in Table 3.4-2. The main pollutants considered in this EIS are ozone (O_3), carbon monoxide (CO), nitrogen dioxide (NO_2), sulfur dioxide (SO_2), and particulate matter less than 10 microns in diameter (PM_{10}).

The existing air quality of the affected environment is defined by air quality data and emissions information. Air quality data are obtained by examining records from air quality monitoring stations maintained by the San Bernardino County Air Pollution Control District (SBCAPCD). Information on pollutant concentrations measured for short-term (24 hours or less) and long-term (annual) averaging periods is extracted from the monitoring station data in order to characterize the existing air quality background of the area. Emission inventory information for the affected environment is obtained from the ARB and George AFB. Inventory data are separated by pollutant and reported in tons per day in order to describe the baseline conditions of pollutant emissions in the area.

Identifying the ROI for an air quality assessment requires knowledge of the pollutant types, source emission rates and release parameters, the proximity relationships of project emission sources to other emission sources, and local and regional meteorological conditions. For inert pollutants (all pollutants other than ozone and its precursors), the ROI is generally limited to an area extending a few miles downwind from the source.

The ROI for ozone may extend much farther downwind than the ROI for inert pollutants. Ozone is a secondary pollutant formed in the atmosphere by photochemical reactions of previously emitted pollutants or precursors. Ozone

Table 3.4-2. National and California Ambient Air Quality Standards

Pollutants	Averaging Time	California Standards[a,c]	National Standards[b] Primary[c,d]	National Standards[b] Secondary[c,e]
Ozone	1-hour	0.09 ppm ($180\ \mu g/m^3$)	0.12 ppm ($235\ \mu g/m^3$)	Same as primary standard
Carbon monoxide	8-hour	9 ppm ($10\ mg/m^3$)	9 ppm ($10\ mg/m^3$)	–
	1-hour	20 ppm ($23\ mg/m^3$)	35 ppm ($40\ mg/m^3$)	–
Nitrogen dioxide	Annual average	–	0.053 ppm ($100\ \mu g/m^3$)	Same as primary standard
	1-hour	0.25 ppm[f] ($470\ \mu g/m^3$)	–	–
Sulfur dioxide	Annual average	–	$80\ \mu g/m^3$ (0.03 ppm)	–
	24-hour	0.05 ppm[f] ($131\ \mu g/m^3$)	$365\ \mu g/m^3$ (0.14 ppm)	–
	3-hour	–	–	$1,300\ \mu g/m^3$ (0.5 ppm)
	1-hour	0.25 ppm ($655\ \mu g/m^3$)	–	–
PM10	Annual 24-hour	$30\ \mu g/m^3$[g] $50\ \mu g/m^3$	$50\ \mu g/m^3$[h] $150\ \mu g/m^3$	Same as primary standard
Sulfates	24-hour	$25\ \mu g/m^3$	–	–
Lead	30-day	$1.5\ \mu g/m^3$	–	–
	Quarterly	–	$1.5\ \mu g/m^3$	Same as primary standard
Hydrogen sulfide	1-hour	0.03 ppm ($42\ \mu g/m^3$)	–	–
Vinyl chloride	24-hour	0.010 ppm ($26\ \mu g/m^3$)	–	–
Visibility[i]	8-hour (10 am to 6 pm, PST)	In sufficient amount to produce an extinction coefficient of 0.23 per km due to particles when the relative humidity is less than 70%. ARB Method V.	–	–

Notes:

(a) California standards for ozone, carbon monoxide, sulfur dioxide (1 hour), nitrogen dioxide, and particulate matter (PM_{10}) are values that are not to be exceeded. The sulfates, lead, hydrogen sulfide, vinyl chloride, and visibility reducing particles standards are not to be equaled or exceeded.

(b) National standards, other than ozone and those based on annual averages or annual arithmetic means, are not to be exceeded more than once a year. The ozone standard is attained when the expected number of days per calendar year, with maximum hourly average concentrations above the standard, is equal to or less than 1.

(c) Concentration expressed first in units in which it was promulgated. Equivalent units given in parentheses are based on a reference temperature of 25° C and a reference pressure of 760 mm of mercury. All measurements of air quality are to be corrected to a reference temperature of 25° C and a reference pressure of 760 mm of mercury (1,013.2 millibar); ppm in this table refers to ppm by volume, or micromoles of pollutant per mole of gas.

(d) National Primary Standards: The levels of air quality necessary, with an adequate margin of safety to protect the public health. Each state must attain the primary standards no later than 3 years after that state's implementation plan is approved by the EPA.

(e) National Secondary Standards: The levels of air quality necessary to protect the public welfare from any known or anticipated adverse effects of a pollutant. Each state must attain the secondary standards within a "reasonable time" after the implementation plan is approved by the EPA.

(f) At locations where the state standards for ozone and/or suspended particulate matter are violated. National standards apply elsewhere.

(g) Calculated as geometric mean.

(h) Calculated as arithmetic mean.

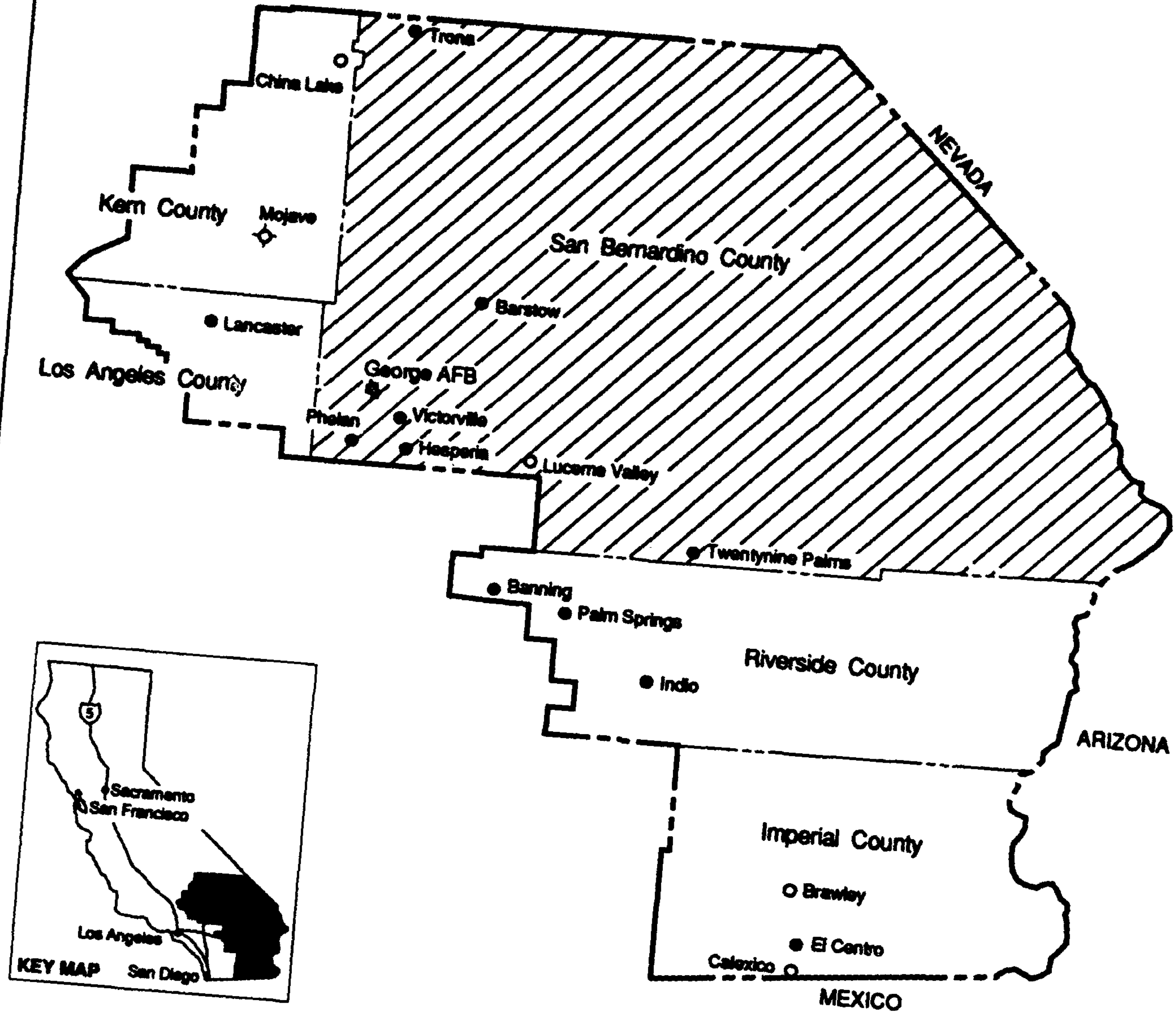
(i) This standard is intended to limit the frequency and severity of visibility impairment due to regional haze and is equivalent to a 10-mile nominal visual range when relative humidity is less than 70 percent.

precursors are mainly reactive organic gases (ROG) in the form of hydrocarbons and nitrogen oxides (NO_x). In the presence of solar radiation, the maximum effect of precursor emissions on ozone levels usually occurs several hours after they are emitted and, therefore, many miles from the source. Ozone and its precursors transported from other regions can also combine with local emissions to produce high local ozone concentrations. Ozone concentrations are generally the highest during the summer months and coincide with periods of maximum insolation. Maximum ozone concentrations tend to be regionally distributed, because precursor emissions are homogeneously dispersed in the atmosphere.

For the purpose of air quality analysis, the ROI for emissions of ozone precursors from the project's construction and operational activities would be the existing airshed surrounding George AFB, i.e., the Southeast Desert Air Basin (SEDAB). Project emissions of ROG and NO_x are, therefore, compared to emissions generated within the SEDAB. (The SEDAB comprises essentially those portions of San Bernardino, Kern, Los Angeles, and Riverside counties east of the Pacific Crest National Scenic Trail, and all of Imperial County.) The ROI for emissions of the inert pollutants (CO, SO_2, and PM_{10}) is limited to the more immediate area of George AFB. Project-related emissions of inert pollutants are, therefore, compared to the San Bernardino County portion of the SEDAB emissions as a means of assessing potential changes in air quality. Outlines of the SEDAB and the San Bernardino County portion of the SEDAB are shown in Figure 3.4-2.

Regulations. The Federal Clean Air Act, as amended in August 1977 and October 1990, dictates that project emission sources must comply with the air quality standards and regulations that have been established by federal, state, and county regulatory agencies. These standards and regulations focus on (1) the maximum allowable ambient pollutant concentrations resulting from project emissions, both separately and combined with other surrounding sources, and (2) the maximum allowable emissions from the project. A summary of relevant air quality regulations is provided in Table 1.5-1.

3.4.3.1 Regional Air Quality. According to the EPA guidelines, an area with air quality better than the NAAQS is designated as being in attainment; areas with worse air quality are classified as nonattainment areas. A nonattainment designation is given to a region if the primary NAAQS for any criteria pollutant is exceeded at any point in the region for more than 3 days during a 3-year period. Pollutants in an area may be designated as unclassified when there is a lack of data for the EPA to form a basis of attainment status. The ARB also designates areas of the state as either in attainment or nonattainment of the CAAQS. An area is in nonattainment for a pollutant if the CAAQS has been exceeded more than once in 3 years. Federal and state attainment designations are shown in Table 3.4-3 for the SEDAB.



Source Modified from: California Air Quality Data, Summary of 1989 Gaseous and Particulate Pollutants, California Air Resources Board Technical Divison.

EXPLANATION

- ● Gaseous pollutant or multipollutant monitoring site (operating during 1989)
- ○ Particulate sampling only (operating during 1989)
- ✧ ARB operated site (operating during 1989)

▨ San Bernardino County Air Pollution Control District

0 10 20 30 40 Miles

Southeast Desert Air Basin

Figure 3.4-2

Table 3.4-3. Federal and State Ambient Air Quality Standard Designations for the Southeast Desert Air Basin

	PM_{10}		SO_2		NO_2		CO		Ozone	
Southeast Desert Air Basin	NAAQS	CAAQS	NAAQS	CAAQS	NAAQS	CAAQS	NAAQS	CAAQS	NAAQS	CAAQS
Kern Co. portion	Group 2	N	U	U	U	A	U	U	U	N
Los Angeles Co. portion	Group 2	N	U	A	A	A	A	A	N	N
Imperial Co. portion	Group 3	N	U	A	A	A	U	U	N	N
San Bernardino Co. portion	Group 3	N	U	A	–	A	–	A	–	N
AQMA part [(a)]	–	–	–	–	A	–	A	–	N	–
Remainder of Co. in SEDAB	–	–	–	–	U	–	U	–	U	–
Riverside Co. portion	–	N	U	A	–	A	–	A	–	N
AQMA part [(b)]	Group 1	–	–	–	A	–	A	–	N	–
Remainder of Co. in SEDAB	Group 3	–	–	–	U	–	U	–	U	–

Notes: Group 1 = Areas having a 95% or better probability of exceeding the standard.
Group 2 = Areas having a 20-95% probability of exceeding the standard.
Group 3 = Areas having less than 20% probability of exceeding the standard.
A = Attainment.
N = Nonattainment.
U = Unclassified. These areas are treated as being in attainment.
(a) The Air Quality Maintenance Area (AQMA) part and the Remainder are subareas which together make up the San Bernardino County portion of the SEDAB. The AQMA part covers approximately half of the county area (southwestern portion).
(b) The AQMA part and the Remainder are subareas which together make up the San Bernardino County portion of the SEDAB. The AQMA part covers approximately one-third of the county area (western portion).

The federal standard for PM_{10} was promulgated in July 1987. Sufficient PM_{10} monitoring data are not yet available to classify many areas of the country. EPA, therefore, designates areas according to the likelihood of violating the standard. Group 1 status is assigned to those areas having a 95 percent or better probability of exceeding the standard, Group 2 to those areas having 20 to 95 percent probability, and Group 3 to areas with less than 20 percent probability. These group classifications will be changed to attainment/nonattainment designations as sufficient monitoring data become available.

Preclosure Reference. The SBCAPCD currently operates air quality monitoring stations throughout San Bernardino County. Stations in the vicinity of George AFB include Victorville, Phelan, and Hesperia. Victorville monitors levels of O_3, SO_2, PM_{10}, and lead; Phelan monitors CO, NO_x, O_3, and SO_2; Hesperia monitors all of the aforementioned pollutants. During the period 1987 to 1989, the NAAQS for O_3 was exceeded less than 4 percent of the time, while the more stringent CAAQS for O_3 was exceeded up to 16 percent of the time (Table 3.4-4). Annual and 24-hour state standards for PM_{10} were exceeded in each of the years from 1987 to 1989, whereas the only exceedance of a national PM_{10} standard occurred in Hesperia in 1989 (annual average).

Despite the nonattainment status of the SEDAB for O_3 and PM_{10}, air quality is generally good around George AFB. The main sources of air pollutants in the area are mining (particulate), cement production (NO_x and particulate), and motor vehicles (hydrocarbons, NO_x, and CO). However, additional air quality problems can be associated with pollutants transported from sources located outside the SEDAB area.

Ozone is formed in the atmosphere in the presence of sunlight, by a series of chemical reactions involving mainly NO_x and reactive hydrocarbons. Ozone concentrations tend to have greater regional significance than other pollutants because their impact can be detected many miles from the source of precursor emissions. Air quality in and around George AFB is directly affected by O_3 transported in from the South Coast Air Basin and San Joaquin Valley Air Basin (ARB, 1989). In 1989, the Victorville air quality monitoring station, about 5 miles southeast of George AFB, recorded 26 days when ozone NAAQS were exceeded. Some of these exceedances were caused by transport influence from the South Coast and San Joaquin Valley Air Basins.

Closure Baseline. It can be reasonably assumed that pollutant concentrations after base closure would be similar to, or somewhat less than, concentrations experienced under preclosure conditions. This is because numerous emission sources would be eliminated by complete closure of the base (e.g., aircraft operations and aerospace ground activity). The closure would also reduce the number of motor vehicles operating in the surrounding area. However, total emissions from the base are small in comparison to the basinwide emissions,

Table 3.4-4. Existing Air Quality in Area of George AFB

Pollutant	Station	Averaging Period	Percentage of Time Federal Standard Exceeded 1987	1988	1989	Percentage of Time California Standard Exceeded 1987	1988	1989	Maximum Concentration (PPM) 1987	1988	1989
Carbon monoxide	Phelan	8-hour	ND	0	0	ND	0	0	ND	5.80	2.00*
	Hesperia		0	0	0	0	0	0	4.00*	3.70*	3.90*
	Phelan	1-hour	ND	0	0	ND	0	0	ND	10.0	4.0*
	Hesperia		0	0	0	0	0	0	5.0*	7.0*	6.0
Nitrogen dioxide	Phelan	Annual	ND	0	0	NS	NS	NS	ND	0.007*	0.007*
	Hesperia		0	0	0	NS	NS	NS	0.014*	0.018	0.020*
	Phelan	1-hour	NS	NS	NS	ND	0	0	ND	0.10*	0.08*
	Hesperia		NS	NS	NS	0	0	0	0.08*	0.07	0.12*
Ozone	Victorville	1-hour	<1	<1	<1	3.8	3.8	5.2	0.18*	0.18	0.17
	Phelan		ND	2.1	2.4	ND	8.8	7.4	ND	0.19	0.22
	Hesperia		3.8	3.4	2.9	16.1	10.0	10.2	0.22*	0.27	0.21
Sulfur dioxide	Victorville	Annual	ND	0	0	NS	NS	NS	ND	0.003*	0.003*
	Phelan		ND	0	0	NS	NS	NS	ND	0.005*	0.001*
	Hesperia		0	0	0	NS	NS	NS	0.000*	0.001	0.001
	Victorville	24-hour	ND	0	0	ND	0	0	ND	0.012*	0.030*
	Phelan		ND	0	0	ND	0	0	ND	0.022	0.024*
	Hesperia		0	0	0	0	0	0	0.001*	0.020	0.016
	Victorville	1-hour	NS	NS	NS	ND	0	0	ND	0.04*	0.06*
	Phelan		NS	NS	NS	ND	0	0	ND	0.03*	0.06*
	Hesperia		NS	NS	NS	0	0	0	0.01*	0.08	0.04
PM_{10} ($\mu g/m^3$)	Victorville	Annual	NS	NS	NS	**	**	ND	35.8	43.3*	ND
	Hesperia	(geometric)	NS	NS	NS	ND	ND	**	ND	ND	53.2
	Victorville	Annual	0	0	ND	NS	NS	NS	42.1	46.1*	ND
	Hesperia	(arithmetic)	ND	ND	**	NS	NS	NS	ND	ND	56.2
	Victorville	24-hour	0	0	ND	33.9	25.0	ND	94	118	ND
	Hesperia		ND	ND	0	ND	ND	67.8	ND	ND	124
Lead ($\mu g/m^3$)	Victorville	Calendar	0	0	ND	NS	NS	NS	0.08*	0.06*	ND
	Hesperia	quarter	0	0	ND	NS	NS	NS	0.03	0.03	ND
	Victorville	30-day	NS	NS	NS	0	0	ND	0.09	0.10	ND
	Hesperia		NS	NS	NS	0	0	ND	0.04	0.05	ND

Notes: NS = No standard established.
ND = No data.
* Data presented are valid, but incomplete in that an insufficient number of valid points were collected to meet EPA and/or ARB criteria for representatives.
** Annual average exceeded for the year.

and the overall effect of closure is expected to have negligible effects on areawide concentrations.

3.4.3.2 Air Pollutant Emission Sources

Preclosure Reference. The most recent emission inventories for George AFB, the SEDAB, and the San Bernardino County portion of the SEDAB, are presented in Table 3.4-5. The emission inventory for George AFB is representative of preclosure conditions in 1988. The inventories for the SEDAB and the San Bernardino County portion of the SEDAB represent 1987 data. The primary emission sources from the base include aircraft, motor vehicles, and aerospace ground equipment. Surface coatings and fuel evaporation contribute a substantial amount of the total hydrocarbon emissions. In addition, aircraft ground operations, fire training operations, and heating/power production add a small portion to the total inventory.

Table 3.4-5. Preclosure Emission Inventory (tons per day)

Source	PM_{10}	SO_2	CO	ROG	NO_x
George AFB [(a)]					
Aircraft Flying Operations	0.13	0.06	4.52	1.18	1.27
Aircraft Ground Operations	0.00	0.01	0.16	0.05	0.04
Aerospace Ground Equipment	0.03	0.01	0.40	0.04	0.41
Heating and Power Production	–	–	0.01	0.00	–
Motor Vehicles (military and civilian)	0.03	0.00	1.36	2.21	0.19
Fire Fighting Practice Pit	0.00	–	0.02	0.01	–
Surface Coating	–	–	–	0.07	–
Fuel Evaporation (gas station and JP-tank)	–	–	–	0.45	–
Subtotal	0.19	0.08	6.47	4.01	1.91
San Bernardino County [(b)]	100	11	190	50	134
Southeast Desert Air Basin [(b)]	N/A	N/A	N/A	150	280

Notes: N/A = Not applicable.
(a) U.S Air Force 1990e.
(b) California Emissions Inventory, 1987 (ARB, 1990a). San Bernardino County inventory includes emissions from that portion of the county in the Southeast Desert Air Basin only.

Closure Baseline. The emission inventory for George AFB after closure will essentially be eliminated. The remaining emissions can be estimated by assuming that emissions other than those associated with aircraft, aerospace ground equipment, fire fighting, and heating/power generation are proportional to the change in on-base population. The ratio of the preclosure base population (including military personnel, military dependents, and civilian employees in 1988) to the base population after closure (1993) is applied to

each of the vehicle, surface coating, and fuel evaporation category emissions in order to estimate closure emissions. Emissions from the aircraft, aerospace ground equipment, and fire fighting categories are eliminated completely. Heating plants and power generators are assumed to operate at 20 percent of the preclosure capacity in order to fulfill minimum building heating and power requirements. Closure baseline emissions are presented in Table 3.4-6.

Table 3.4-6. Closure Emission Inventory (tons per day)

Source	PM_{10}	SO_2	CO	ROG	NO_x
Aircraft Flying Operations	–	–	–	–	–
Aircraft Ground Operations	–	–	–	–	–
Aerospace Ground Equipment	–	–	–	–	–
Heating and Power Production	–	–	0.002	0.001	–
Motor Vehicles (military and civilian)	0.000	0.000	0.001	0.001	0.000
Fire Fighting Practice Pit	–	–	–	–	–
Surface Coating	–	–	–	0.000	–
Fuel Evaporation (gas station and JP-tank)	–	–	–	0.000	–
Total	0.000	0.000	0.003	0.002	0.000

Note: Emissions are based on data from Table 3.4-5 times the ratio of the year 1993 base closure population to year 1988 base population.

3.4.4 Noise

The ROI for noise sources at George AFB is limited to the Victor Valley portion of San Bernardino County. The area most affected by the base closure and reuse is limited to the base property itself, the cities of Adelanto and Victorville, and adjacent unincorporated lands.

The characteristics of sound include parameters such as amplitude, frequency, and duration with an extremely large range of amplitudes. The decibel (dB), a logarithmic unit that accounts for the large variations in amplitude, is the accepted standard unit measurement of sound. Table 3.4-7 presents examples of typical sound levels. Sound also varies with frequency or pitch. When measuring sound to determine its effects on a human population, A-weighted (dBA) sound levels are typically used to account for the response of the human ear. A-weighted sound levels represent the sound level according to a prescribed frequency response established by the American National Standards Institute (ANSI S1.4-1983).

Noise is usually defined as sound that is undesirable because it interferes with speech communication and hearing, is intense enough to damage hearing, or is otherwise annoying. Noise levels often change with [illegible]; therefore, to compare levels over different time periods, several descriptors were developed that take into account this time-varying nature. These descriptors are used to assess and correlate the various effects of noise on man and animals, including land-use

Table 3.4-7. Comparative Sound Levels

Common Outdoor Noise Levels	Noise Level (dBA)	Common Indoor Noise Levels
	110	Rock Band
Jet Flyover at 1000 ft		
	100	Inside Subway Train (New York)
Gas Lawnmower at 3 ft		
	90	
		Food Blender at 3 ft
Noisy Urban Daytime		Garbage Disposal at 3 ft
	80	
		Shouting at 3 ft
Diesel Truck at 50 ft		
Gas Lawnmower at 100 ft		Vacuum Cleaner at 10 ft
	70	
Commercial Area		Normal Speech at 3 ft
Heavy Traffic at 300 ft		
	60	
		Large Business Office
		Dishwasher Next Room
	50	
		Small Theater, Large Conference Room (Background)
Quiet Urban Nighttime	40	
Quiet Suburban Nighttime		Library
	30	Bedroom at Night
Quiet Rural Nighttime		Concert Hall (Background)
	20	
		Broadcast and Recording Studio
	10	
		Threshold of Hearing
	0	

Source: Acentech, 1990.

compatibility, sleep interference, annoyance, hearing loss, speech interference, and startle effects. One descriptor used to describe time-varying sound is the Sound Exposure Level (SEL). The SEL value represents the A-weighted sound level integrated over the entire duration of the noise event and referenced to a duration of 1 second. When an event lasts longer than 1 second, the SEL value will be higher than the highest sound level during the event.

The DNL was developed to evaluate the total community noise environment. The DNL (sometimes abbreviated as L_{dn}) is the average A-weighted acoustical energy during a 24-hour period with a 10 dB adjustment added to the nighttime levels (between 10 p.m. and 7 a.m.). This adjustment is an effort to account for the increased sensitivity to nighttime noise events. The DNL was developed by the EPA and is mandated by HUD, the FAA, and DOD. The noise descriptors used in this report are the DNL and SEL.

The DNL is an accepted unit for quantifying human annoyance to general environmental noise, which includes aircraft noise. The Federal Interagency Committee on Urban Noise developed land-use compatibility guidelines for noise in terms of DNL (USDOT, 1985). The California Department of Health, Office of Noise Control, has also developed land use compatibility guidelines. The Office of Noise Control guidelines give 60 to 70 dB as the maximum normally acceptable level and 70 dB as the conditionally acceptable level for noise-sensitive receptors such as residences, transient lodging, churches, and schools. The San Bernardino County Noise Element also provides land use guidelines. The County gives 60 dB as the acceptable external noise level for residential lands and 65 dB if noise reduction is incorporated and the interior level is below 45 dB. Table 3.4-8 provides FAA-recommended DNL ranges for various land use categories based upon the committee's guidelines. The FAA guidelines were used in this study to determine noise impacts.

Appendix J provides additional information about the measurement and prediction of noise. This appendix also provides more information on the units used in describing noise, as well as information about the effects of noise such as annoyance, sleep interference, speech interference, health effects, and effects on animals.

3.4.4.1 Existing Noise Levels. Typical noise sources in and around airfields usually include aircraft, surface traffic, and other human activities. Military aircraft operations and surface traffic on local streets and highways are the existing primary sources of noise in the vicinity of George AFB. In airport analyses, areas with DNL above 65 dBA are often considered in land-use compatibility planning and impact assessment; therefore, the contours of DNL greater than 65 dBA are of particular interest.

Table 3.4-8. Land Use Compatibility Guidelines in Aircraft Noise Exposure Areas

The designations contained in this table do not constitute a federal determination that any use of land covered by the program is acceptable or unacceptable under federal, state, or local law. The responsibility for determining the acceptable and permissible land uses and the relationship between specific properties and specific noise contours rests with the local authorities. FAA determinations under Part 150 are not intended to substitute federally determined land uses for those determined to be appropriate by local authorities in response to locally determined needs and values in achieving noise compatible land uses.

Land Use	DNL 65-70	DNL 70-75	DNL 75 and above
Residential			
Residential, other than mobile homes/transient lodgings	NLR required[a]	NLR required	Incompatible
Mobile home parks	Incompatible	Incompatible	Incompatible
Transient lodgings	NLR required[a]	NLR required1	Incompatible
Public Use			
Schools, hospitals, and nursing homes	NLR required[a]	Incompatible	Incompatible
Churches, auditoriums, and concert halls	NLR required[a]	NLR required	Incompatible
Governmental services	Compatible	NLR required	NLR required
Transportation	Compatible	Compatible[b]	Compatible[b]
Parking	Compatible	Compatible[b]	Compatible[b]
Commercial Use			
Offices, business and professional	Compatible	NLR required	NLR required
Wholesale and retail - building materials, hardware, and farm equipment	Compatible	Compatible[b]	Compatible[b]
Retail trade - general	Compatible	NLR required	NLR required
Utilities	Compatible	Compatible[b]	Compatible[b]
Communication	Compatible	NLR required[a]	NLR required[a]
Manufacturing and Production			
Manufacturing, general	Compatible	Compatible[b]	Compatible[b]
Photographic and optical	Compatible	NLR required	NLR required
Agriculture (except livestock) and forestry	Compatible	Compatible	Compatible
Livestock farming and breeding	Compatible	Compatible	Incompatible
Mining and fishing, resource production and extraction	Compatible	Compatible	Compatible
Recreational			
Outdoor sports arenas and spectator sports	Compatible	Compatible	Incompatible
Outdoor music shells, amphitheaters	Incompatible	Incompatible	Incompatible
Nature exhibits and zoos	Compatible	Incompatible	Incompatible
Amusements, parks, resorts, and camps	Compatible	Compatible	Incompatible
Golf courses, riding stables, and water recreation	Compatible	Compatible	Incompatible

Notes:

DNL: Day-night sound level in decibels.

Compatible: Generally, no special noise attenuating materials are required to achieve an interior noise level of DNL 45 in habitable spaces, or the activity (whether indoors or outdoors) would not be subject to a significant adverse effect by the outdoor noise level.

NLR: Noise Level Reduction. NLR is used to denote the total amount of noise transmission loss in decibels required to reduce an exterior noise level in habitable interior spaces to DNL 45. In most places, typical building construction automatically provides an NLR of 20 decibels. Therefore, if a structure is located in an area exposed to aircraft noise of DNL 70, the interior level of noise would be about DNL 45. If the structure is located in an area exposed to aircraft noise of DNL 70, the interior level of noise would be about DNL 50, so an additional NLR of 5 decibels would be required if not afforded by the normal construction. This NLR can be achieved through the use of noise attenuating materials in the construction of the structure.

Incompatible: Generally, the land use, whether in a structure or an outdoor activity, is considered to be incompatible with the outdoor noise exposure, even if special attenuating materials were to be used in the construction of the building.

(a) The land use is generally incompatible and should only be permitted in areas of infill in existing neighborhoods or where the community determines that the use must be allowed.

(b) NLR required in offices or other areas with noise sensitive activities.

Sources: Derived from the U.S. Department of Transportation, Federal Aviation Administration, Federal Aviation Regulations (FAR) Part 150, "Airport Noise Compatibility Planning," Code of Federal Regulations, Title 14, Chapter 1, Subchapter 1, Part 150, Table 1, (January 18, 1985, revised October 25, 1989).

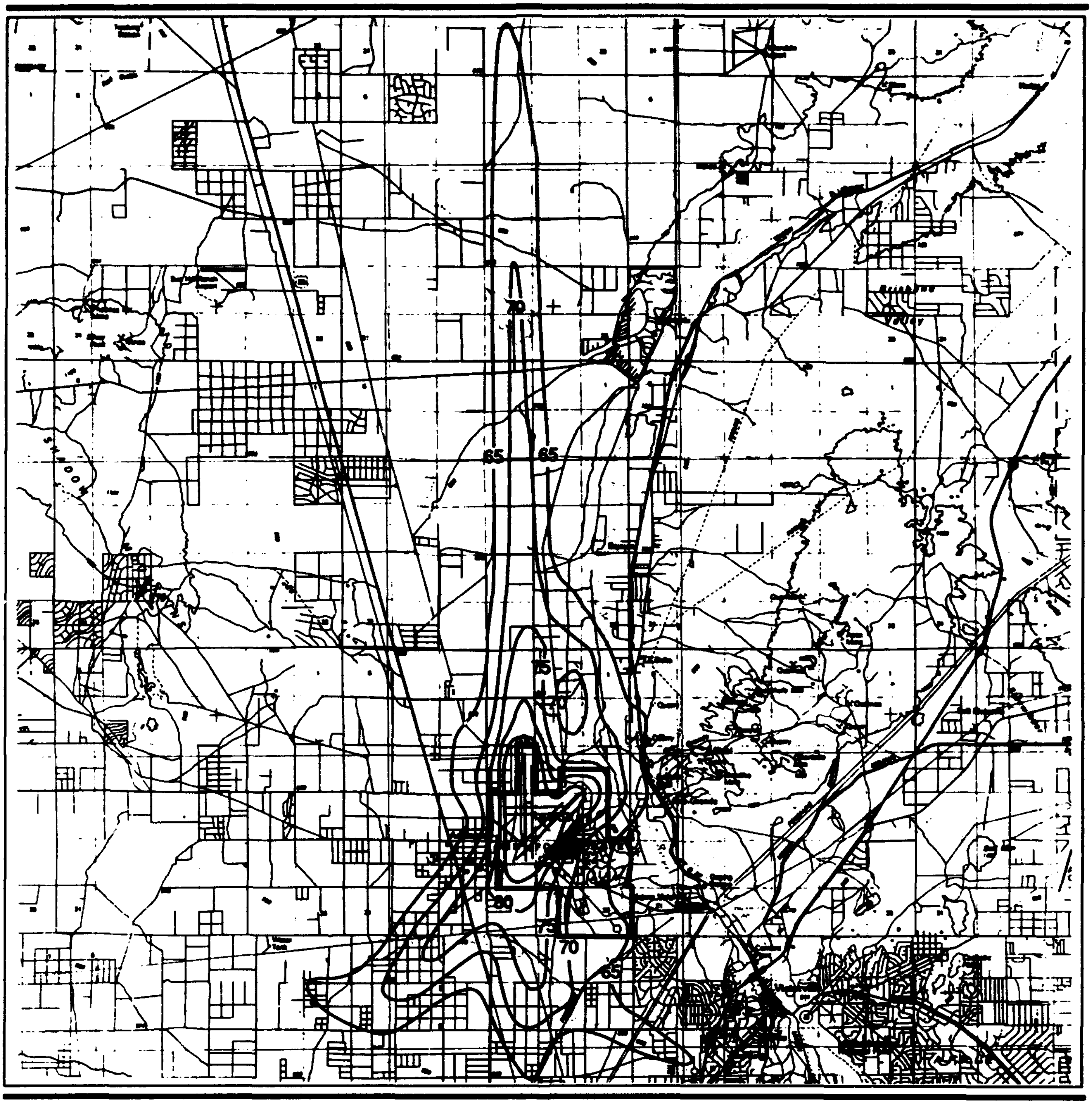
Preclosure Reference. Aircraft noise at George AFB occurs during aircraft engine warmup, maintenance and testing, taxiings, takeoffs, approaches, and landings. Noise contours for preclosure aircraft operations were taken from the closure EIS for George AFB. Information used in the closure study included information on aircraft types; runway use; runup locations; takeoff and landing flight tracks; aircraft altitude, speeds, and engine power settings; and number of daytime (7 a.m. to 10 p.m.) and nighttime (10 p.m. to 7 a.m.) operations. The noise contours for preclosure are shown in Figure 3.4-3. Only those contours equal to or above DNL 65 are shown.

Surface vehicle traffic noise levels for roadways in the vicinity of George AFB were analyzed using the Federal Highway Administration's (FHWA's) Highway Noise Model (FHWA, 1978). This model incorporates vehicle mix, traffic volume projections, and speed to generate DNL. The noise levels are then presented as a function of distance from the centerline of the nearest road. The results of the modeling for surface traffic are presented in Table 3.4-9. The actual distances to the DNLs may be less than those presented in Table 3.4-9 because the screening effects of intervening buildings, terrain, and walls were not accounted for in the modeling.

Table 3.4-9. Distance to DNL from Roadway Centerline for the Preclosure Reference and Closure Baseline

	Distance (feet)					
Roadway	DNL 65	No. of Residences	DNL 70	No. of Residences	DNL 75	No. of Residences
Preclosure						
Air Base Road West	140	2	50	0	*	-
Air Base Road East	220	4	70	0	*	-
U.S. 395	180	13	60	0	30	0
El Mirage Road	*	-	*	-	*	-
Helendale Road	*	-	*	-	*	-
Village Drive	140	2	50	0	*	-
Shay Road	*	-	*	-	*	-
Closure						
Air Base Road West	30	0	*	-	*	-
Air Base Road East	40	0	*	-	*	-
U.S. 395	220	13	70	0	30	0
El Mirage Road	*	-	*	-	*	-
Helendale Road	*	-	*	-	*	-
Village Drive	*	-	*	-	*	-
Shay Road	*	-	*	-	*	-

* Contained within the roadway.
** Number of houses between Air Base Road and power lines south of Clovis Street (approximately 1.5 miles).



Preclosure Noise Contours

0 .75 1.5 3 Miles

Figure 3.4-3

Appendix J contains the data used in the surface traffic analysis. These data include AADTs, traffic mix and speeds.

Closure Baseline. The projected noise levels for the closure baseline were calculated using the traffic projections at base closure (Appendix J). The results of the modeling for the roadways analyzed are presented in Table 3.4-9. Again, the actual distances to the DNLs may be less than those presented in the table because the model does not account for screening effects of intervening buildings, terrain, and walls.

3.4.4.2 Noise-Sensitive Areas. The preclosure ROI for George AFB includes noise-sensitive receptors such as residential units, hospitals, classrooms, and parks that are within the DNL 65 dB contour. The contours from the *Final Environmental Impact Statement for the Closure of George Air Force Base* indicate that there are 30,900 acres exposed to DNL 65 or greater in and around George AFB. This includes 17,000 acres with 5,000 residents in the region between DNL 65 and 70, and 7,200 acres with 2,600 residents in the region between DNL 70 and 75. Section 3.2.3, Land Use and Aesthetics, describes land uses on and near the base.

At closure it is assumed that there would be no aircraft operations and, therefore, there would be no areas impacted by aircraft noise.

3.4.5 Biological Resources

Biological resources include the native and naturalized plants and animals in the project area. For discussion purposes, these are divided into vegetation, wildlife (including aquatic biota), threatened or endangered species, and sensitive habitats. Human activities in the immediate vicinity of George AFB have altered the natural environment primarily through urbanization. Some irrigated agriculture occurs along the Mojave River to the east of George AFB and a mining operation is located near Oro Grande. The remaining undeveloped areas are in a relatively undisturbed condition, although off road vehicle (ORV) use, road construction, and other human activities have resulted in scattered localized habitat alteration.

The ROI used for discussions of the biological resources present and potential impacts on these resources is the base and the surrounding area within about 5 miles of the base. This includes the area within which potential impacts could occur and provides a basis for evaluating the level of impact.

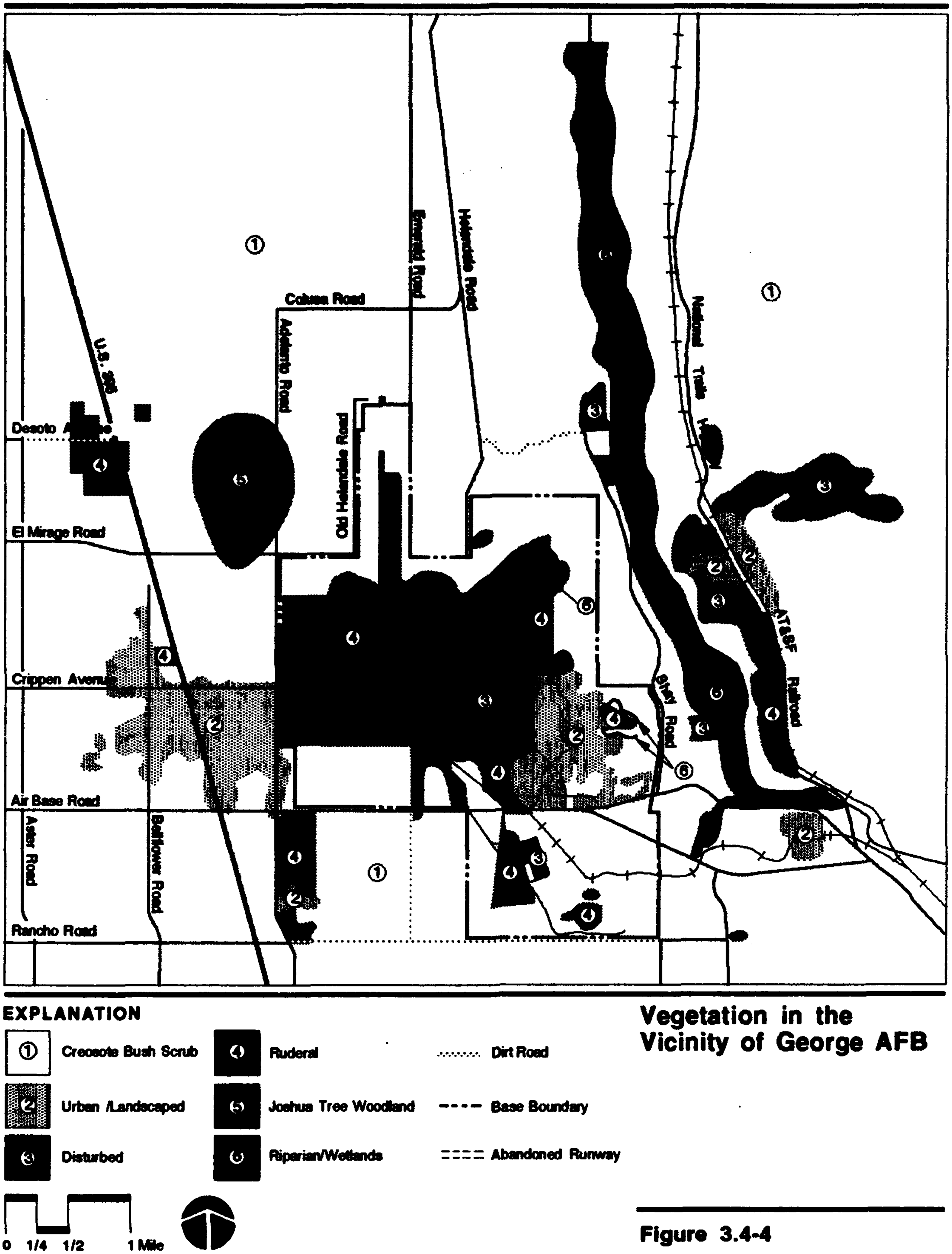
The following descriptions are based on literature information for the area, aerial photographs (dated November 1985), a February 1991 reconnaissance survey of the area outside the base, and a March 1991 field survey on the base.

3.4.5.1 Vegetation. George AFB is located on an alluvial mesa adjacent to the western bank of the Mojave River. The hot, dry climate and lack of varied topography on the base and in the surrounding area have resulted in vegetation that is predominantly creosote bush scrub. This community is dominated by creosote bush (*Larrea tridentata*) and various other shrubs that occur as co-dominants, notably burro weed (*Ambrosia dumosa*) and saltbush (*Atriplex* spp.). The ephemeral drainages of the area support a variety of species, from typically upland species such as Mojave rubber rabbitbrush (*Chrysothamnus nauseosus* ssp. *mohavensis*) and snakeweed (*Gutierrezia sarothrae*) to moisture-seeking species, such as mulefat (*Baccharis salicifolia*) and cattail (*Typha latifolia*). The Mojave River is east of the base boundary and supports a broadleaved winter-deciduous community known as Mojave riparian forest, visually dominated by a canopy of Fremont cottonwoods (*Populus fremontii*) and willows (*Salix* spp.).

The vegetation of the project area is shown in Figure 3.4-4. The categories include creosote bush scrub, Joshua tree woodland, riparian/wetland, ruderal, urban/landscaped, and disturbed habitat. The riparian/wetland category includes the Mojave riparian forest, riparian scrub (dominated by mulefat and/or shrubby willows), freshwater marsh (primarily cattails and sedges), and sandy stream channels bordered by riparian vegetation. The ruderal category includes areas that have been temporarily disturbed, allowing weedy plant species (e.g., tumbleweeds, mustards) to colonize. For clarification purposes, two other categories are presented on the vegetation map. Non-vegetated areas that are paved (e.g., roads, parking lots, airfield, support facilities), graded or filled, and covered with structures are classified as disturbed habitat. Surface-mined areas are also classified as disturbed. On-base residential areas are classified as urban/landscaped (a mixture of disturbed and landscaped). Residential and commercial industrial areas in Adelanto, Oro Grande, and Mojave Heights are included in the urban/landscaped category.

Much of the on-base native vegetation has been disturbed. In some areas, it has been permanently replaced by base-related facilities and landscaping, whereas in others it has been temporarily disturbed, allowing large populations of tumbleweeds (*Salsola* spp.) and other weeds to colonize and thrive. Approximately 454 acres have been landscaped, including playing fields, lawns, and the golf course. Buildings and pavement cover another 187 acres. Vegetation manipulation and maintenance (e.g., mowing, seeding, application of oil palliatives for dust control) take place over 2,125 acres. The remaining 2,307 acres, primarily comprising creosote bush scrub, are not actively managed. Herbicides used for weed control include 2,4-D in lawn areas and 2,4-D or dicambra for Russian thistles in large areas (U.S. Air Force, 1990a).

Native vegetation remaining on the upland areas of the base is fairly uniform and consists mainly of creosote bush scrub, although the co-dominant species in this community vary on different areas of the base. The scrub on the western



Vegetation in the Vicinity of George AFB

Figure 3.4-4

and northern areas of the base and its surrounding areas is dominated by creosote bush and burro weed. Occasional small stands of almost pure burro weed occur on the western side of the base. Joshua trees (*Yucca brevifolia*) are common, particularly outside the base boundary just west of Helendale Road. Other common associates in this area are Mojave rubber rabbitbrush, Mormon tea (*Ephedra nevadensis*), and cotton-thorn (*Tetradymia* sp.). Tumbleweeds dominate some of the area that has been disturbed by runways and other base activity. The eastern side of the base is also dominated by creosote bush. Although burro weed is still common, particularly in the northeast portion of the base, saltbush species (*Atriplex confertifolia, A. polycarpa*) are the principal co-dominants. Pencil cactus (*Opuntia ramosissima*), Mormon tea, spiny hopsage (*Grayia spinosa*), and cotton-thorn are prevalent. Several dense stands of tumbleweeds are present. In some low-lying areas in the southeast portion of the base, there are nearly pure formed stands of saltbush and Mojave rubber rabbitbrush. Creosote bush and saltbush dominate the undisturbed southern parts of the base, with occasional Joshua trees and cotton-thorn. Much of the southern area has been highly disturbed by base activities, which has given rise to large tumbleweed and mustard (*Brassica geniculata*) populations. Grass and herbaceous species throughout the creosote bush scrub community include galleta grass (*Hilaria rigida*), Indian ricegrass (*Oryzopsis hymenoides*), red brome (*Bromus rubens*), sandmat (*Euphorbia polycarpa*), and chia (*Salvia columbariae*).

Several ephemeral drainages occur on the base and in the area immediately adjacent to the base, generally following the slope of the mesa northward or running in an easterly direction toward the Mojave River. The drainage that flows northeast from the runway area to the river supports a limited amount of riparian vegetation (primarily mulefat) in association with upland species, such as Mojave rubber rabbitbrush, saltbush, and snakeweed. These washes do not form a true riparian association. In other drainages, particularly two east-flowing washes that originate near the residential section of the base, a more diverse riparian community that includes cottonwoods, willows, cattails, and mulefat is found.

Some areas of the base, such as the golf course and playing fields, have been landscaped. Non-native grasses cover these areas, and species such as pines, palms, and other common landscape trees and shrubs have also been planted (U.S. Air Force, 1990a).

The Mojave River has been affected by upstream diversions and drought, but it still supports a diverse community of trees and shrubs known as Mojave riparian forest. On the floodplain near the Mojave River, Fremont cottonwoods form a relatively open, deciduous canopy beneath which grows many shrub species including Mojave rubber rabbitbrush, mulefat, Great Basin sagebrush (*Artemisia tridentata*), yerba santa (*Eriodictyon trichocalyx*), California buckwheat (*Eriogonum fasciculatum*), and Torrey saltbush (*Atriplex torreyi*). Along the

streambanks, black willow *(Salix gooddingii)* and red willow *(S. laevigata)* are the prominent species, while common associates include mulefat, mugwort *(Artemisia douglasiana)*, sedge *(Carex* sp.), and deergrass *(Muhlenbergia rigens)*. The non-native tamarisk *(Tamarix* spp.) is another common streamside species.

The area north of the base between the Mojave River and U.S. Highway 395 is also within the alternative reuse planning area. Although creosote bush scrub is the dominant plant community, Joshua trees are abundant in the western portions of the area.

The California Desert Native Plant Act (Food and Agriculture Code, 1986) gives special consideration to a number of species for their individual uniqueness and/or their contribution to the well-being of the desert ecosystem. Species in the area receiving protection are all members of the families Agavaceae (including Joshua trees) and Cactaceae (including chollas), and catclaw *(Acacia greggii)*. Removal of these species requires a permit issued by either the agricultural commissioner or the sheriff of the county in which they are growing.

3.4.5.2 Wildlife Resources. Wildlife in the vicinity of George AFB includes species associated with Mojave creosote scrub, Mojave riparian forest, and agricultural and urbanized areas. These habitats support a wide range of species including several that are considered sensitive by state and federal governments (Section 3.4.5.3). Wildlife activity is highest in the undisturbed habitats and lowest in areas disturbed by Air Force activities, urbanization, and ORV use.

Common mammals of the George AFB vicinity include black-tailed jackrabbit *(Lepus californicus)*, coyote *(Canis latrans)*, Audubon cottontail *(Sylvilagus audubonii)*, and kit fox *(Vulpes macrotis)*. These species can be found in all habitat types of the area with the exception of those with heavy human influence. The antelope ground squirrel *(Ammospermophilus leucurus)*, desert kangaroo rat *(Dipodomys deserti)*, Merriam's kangaroo rat *(Dipodomys merriami)*, and desert pocket mouse *(Perognathus penicillatus)* occur away from trees in creosote scrub habitat with light, sandy soils.

Rodent control takes place on the base, primarily on the golf course. Traps are used for gophers, and diphacin bait is used for ground squirrels (U. S. Air Force, 1990a).

Birds present include the common raven *(Corvus corax)*, which frequents all habitat types. The horned lark *(Eremophila alpestris)*, loggerhead shrike *(Lanius ludovicianus)*, mourning dove *(Zenaida macroura)*, quail *(Callipepla* sp.), greater roadrunner *(Geococcyx californianus)*, lesser nighthawk (*Chordeiles acutipennis)*, and Say's phoebe *(Sayornis saya)* can be found in creosote scrub

habitat and light agricultural areas. The cactus wren *(Campylorhynchus brunneicapillus)* is common in creosote scrub with a moderate amount of cactus for nesting and protection. The red-tailed hawk *(Buteo jamaicensis)* and American kestrel *(Falco sparverius)* are likely to nest in the Mojave riparian forest and hunt over the desert scrub. The house finch *(Carpodacus neomexicanus)*, common barn owl *(Tyto alba)*, and white-crowned sparrow *(Zonotrichia leucophrys)* are associated with agricultural and urbanized areas in the vicinity.

Resident reptiles of the Mojave creosote scrub include the side-blotched lizard *(Uta stansburiana)*, California whiptail *(Cnemidophorus tigris)*, zebra tailed lizard *(Callisauris draconoides)*, desert spiny lizard *(Phrynosoma platyrhinos)*, western patch-nosed snake *(Salvadora hexalepis)*, rattlesnake *(Crotalus* spp.*)*, and western shovel-nosed snake *(Chionactis occipitalis)*. The western fence lizard *(Sceloporus occidentalis)* is common to the urban and riparian areas, but not the desert scrub.

Two species of amphibians may occur in Mojave creosote scrub: the western spadefoot *(Scaphiopus hammondi)* and the western toad *(Bufo boreas)*.

The Mojave riparian forest located just east of the boundary, is a particularly important habitat for wildlife in the area due to of the lack of water, trees, and dense scrub in the surrounding uplands. Many birds nest and shelter in the tall canopy of cottonwoods and willows while mammals and amphibians make homes in the riverbank and riparian understory. The forest is especially important to migrating birds. The greater diversity of plants and insects in the Mojave riparian forest provides a greater food base than the surrounding habitats, allowing for a higher density of wildlife. This habitat, however, is not pristine. George AFB is located west of the Mojave River, and aircraft from the base occasionally fly over the riparian corridor, generally above 1,000 feet AGL. Developments along the eastern side of the river include the Southern Pacific Railroad, irrigated agriculture, mining operations, and several small towns. All of these contribute disturbances, particularly noise and human presence, that affect wildlife use of the riparian habitat.

Aquatic habitats in the high desert near George AFB are limited to ephemeral drainages (arroyos), the Mojave River (with perennial flow near the base), and a small reservoir between the river and the base. Streams with intermittent flow typically support a variety of aquatic insects (e.g., mosquitoes and various flies) and other species, such as frogs and toads, that need water for only part of their life cycle. A more diverse flora and fauna is generally present in perennial waters. Sixteen species of fish have been reported in the Mojave River system (Moyle, 1976), and only one of these, the Mohave tui chub (*Gila bicolor mohavensis)*, listed as endangered and discussed in Appendix K, is native to this system. Downstream of the Lower Narrows, in the vicinity of George AFB, few fish are expected to be present in the river. Mosquitofish *(Gambusia affinis)*

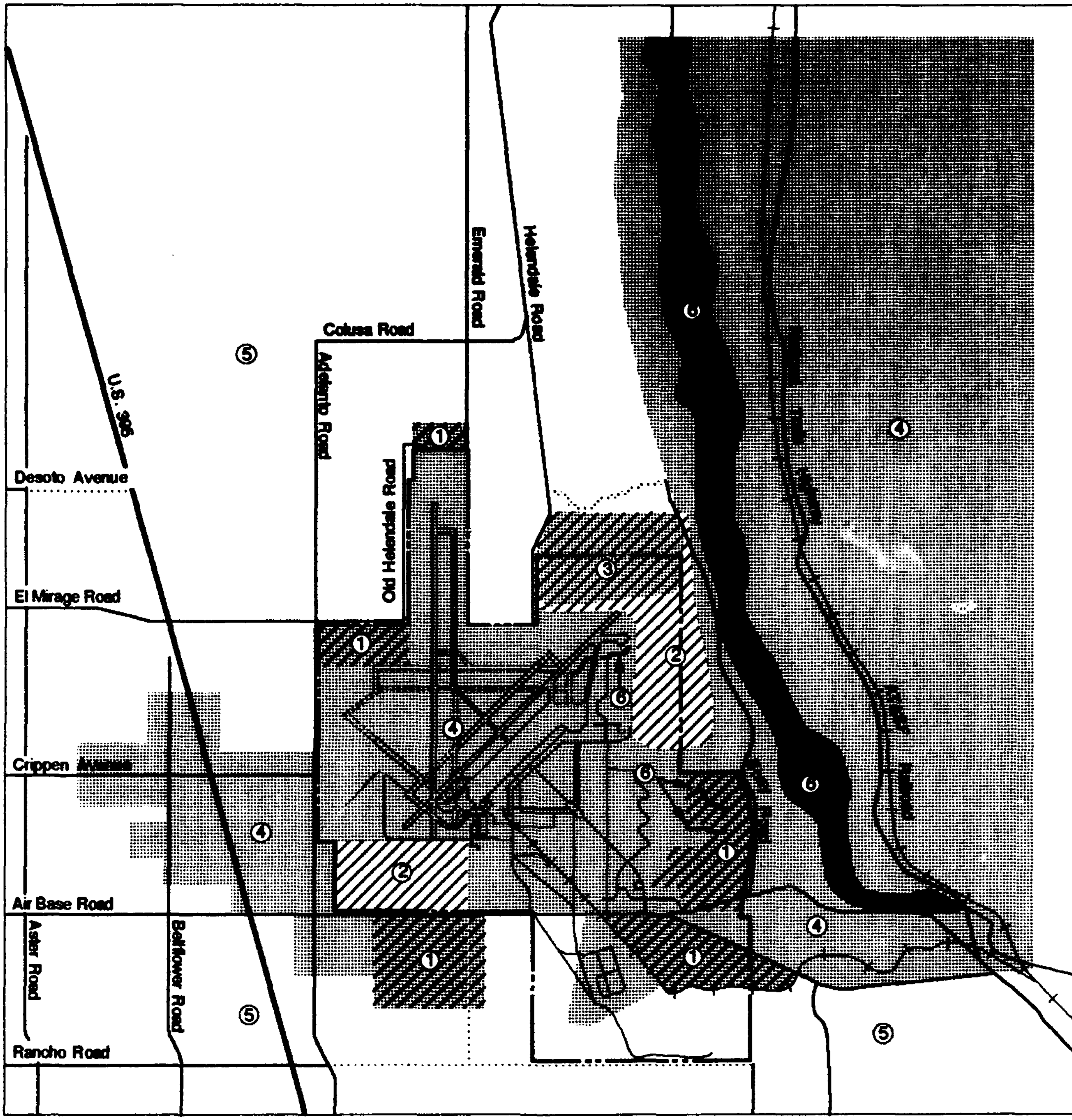
and arroyo chubs *(Gila orcutti)* are the most likely species to be present. Other fish species (primarily introduced game fish) may occur as transients during peak runoff periods.

The small reservoir between the river and the base is likely to support a variety of aquatic invertebrates when water is present. Amphibians may breed there as well.

Aquatic biota are unlikely to be present in the ephemeral drainages on the base and in the area proposed for development of the international airport, because water is present for only a short time. No evidence of locations that could hold standing or flowing water long enough for colonization by aquatic biota were found within these drainages during field surveys in February and March 1991. Only the drainage ditch along the east side of the cross-wind runway could possibly contain water long enough in wet years to support aquatic fauna. The small reservoir used for golf course irrigation probably supports an aquatic fauna dominated by various life stages of aquatic insects (e.g., midge and fly larvae and dragonfly nymphs).

3.4.5.3 Threatened and Endangered Species. A number of federally and state listed threatened, endangered, candidate, or special concern species are known to be present in the vicinity of George AFB (LSA, 1988; City of Adelanto, 1990). The status and distribution of these species was determined through reference to the California Natural Diversity Database, contacts with federal and state agencies, and a literature review. A letter was sent to the U.S. Fish and Wildlife Service (USFWS) requesting a list of species in the project area as required for initiation of informal consultation under Section 7 of the Endangered Species Act, as amended. Their reply indicates the number of species that could occur in the vicinity of George AFB. Threatened, endangered, and other species of concern that are or may be present on and near George AFB are listed and discussed in Appendix K.

The primary species of concern in the ROI is the desert tortoise *(Gopherus agassizii)*. The Mojave population of this species was federally listed as an endangered species in 1989 by emergency rule and as a threatened species by final rule in April 1990. It is also state-listed as threatened. The desert tortoise requires firm but not hard ground (such as the banks of washes or compacted sand) for construction of burrows. Mojave desert areas, with moderate shrub cover and relatively free of human disturbance, are probable habitats for the tortoise. A Bureau of Land Management (BLM) map of tortoise density shows the northern third of George AFB to be in a geographic area capable of supporting 20 to 50 tortoises per square mile (Western Mojave Land Tenure Adjustment Project, 1988). A recent biological survey (SAIC, 1990a) has shown that the desert tortoise inhabits portions of George AFB and its vicinity (Figure 3.4-5). A 304-acre area in the northeast corner of the base (and extending outward past the base boundary) is expected to have high densities



EXPLANATION

Surveyed

- ① No Tortoises
- ② Low Density (20-50 Tortoises/Sq Mi)
- ③ High Density (50-100 Tortoises/Sq Mi)

Unsurveyed

- ④ Presumed No Tortoises (Unsuitable Habitat)
- ⑤ Presumed Low Density (Suitable Habitat)

- ⑥ Riparian/Wetlands
- Base Boundary
- Abandoned Runway

0 1/4 1/2 1 Mile

Desert Tortoise Distribution/Wetlands and Riparian Habitat

Figure 3.4-5

of desert tortoises (50 to 100/square mile). Low densities were found in 730 acres, and the remainder of the area surveyed (1,130 acres) contained no tortoises.

Species that are candidates for federal listing and that are likely to be present in the ROI are the Mohave ground squirrel *(Spermophilus mohavensis)*, Barstow woolly sunflower *(Eriophyllum mohavense)*, desert cymopterus *(Cymopterus deserticola)*, Mojave monkey flower *(Mimulus mohavensis)*, California red-legged frog *(Rana aurora draytoni)*, southwestern pond turtle *(Clemmys marmorata pallida)*, and the San Diego coast horned lizard *(Phrynosoma coronatum blainvillei)*. The Mohave ground squirrel is state-listed as threatened, as is the Swainson's hawk *(Buteo swainsoni)*. The red-legged frog, pond turtle, and horned lizard are also state-designated species of special concern, and the three plant species are on List 1B of the California Native Plant Society (i.e., rare, threatened, or endangered in California and elsewhere). Other state-designated species of special concern expected or known to occur in the project area include golden eagle *(Aguila chrysaetos)*, LeConte's thrasher *(Toxostoma lecontei)*, prairie falcon *(Falco mexicanus)*, summer tanager *(Piranga rubra)*, burrowing owl *(Athene cunicularia)*, short-eared owl *(Asio flammeus)*, and Mojave buckwheat *(Chorizanthe spinosa)*.

3.4.5.4 Sensitive Habitats. Sensitive habitats include wetlands, plant communities that are unusual or of limited distribution, and important seasonal use areas for wildlife (e.g., migration routes, breeding areas, or crucial summer/winter habitat). In the vicinity of George AFB, wetlands and riparian woodlands associated with the Mojave River are the primary sensitive habitats. Aerial photographs of the base (dated November 23, 1985) indicated the presence of a small pond just south of the base housing area and two short segments of drainages that required field survey to determine their wetland status. A field survey was conducted in March 1991 to verify the presence or absence of wetlands on the base and to determine the size of those present. Habitat for the desert tortoise has been discussed under Section 3.4.5.3. Wetlands and riparian areas in the project area are shown in Figure 3.4-5.

Wetlands are defined as "those areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions" (Federal Interagency Committee for Wetland Delineation, 1989). Areas that are periodically wet but do not meet all three criteria (hydrophytic vegetation, hydric soils, and wetland hydrology) are not jurisdictional wetlands subject to Section 404 of the Federal Clean Water Act and to the swampbuster provision of the Federal Food Security Act. Areas that have been disturbed or that are classified as problem area wetlands, however, may not meet all three criteria as a result of natural or man-induced reasons, yet are still considered wetlands.

The routine on-site method, plant community assessment procedure, was used for the two drainage channels adjacent to the housing area. The hydrophytic vegetation criterion was met (all dominants were obligate wetland species), and the wetland boundary was abrupt. This (by Step 7 in the manual) eliminated the need for examining soils. Although the hydrology has been disturbed (i.e., runoff has become concentrated by storm drains and enhanced due to lawn irrigation), the hydrology criterion was met and both are jurisdictional wetlands. For the drainage channel adjacent to the cross-wind runway, the same general methods were used, but this wetland came under the problem area wetland category because it is manmade (channelized), has sandy soils, and contains numerous upland plant species along with the wetland species. Considering the natural conditions present, this channel was determined to be a wetland (downstream to a break in topography) based on vegetation and hydrology indicators. The small pond south of the housing area is managed for golf course irrigation and is not a jurisdictional wetland.

The three wetland areas identified on base from the field survey all occur in natural (or altered) drainage pathways but owe their above-average water supply to runoff from base activity. Each area is less than 1 acre in size. The wetland northeast of the housing area is about 0.43 acres, the one east of the housing area is 0.02 acres, and the drainage channel near the runway is approximately 0.87 acres. The total acreage for these three wetland areas is approximately 1.32 acres.

Filling of wetland areas totalling less than 10 acres does not require an individual Corps of Engineers (COE) permit, since this is an activity covered by the existing authorization of a nationwide permit. Filling of a wetland between 1 and 10 acres requires prior notification to the COE, whereas filling of a wetland under 1 acre does not. However, notification of the COE is recommended even in those cases where filling of less than 1 acre is anticipated.

Two of the wetlands are located just east of the base residential area (Figure 3.4-5), occurring at the end of culverts carrying residential runoff. Wetland vegetation in both would presumably die off if landscape irrigation were discontinued. The northernmost and larger of the two is located at the upstream end of a riparian zone approximately 900 feet long. The wetland is approximately 125 by 150 feet (0.43 acre) and is dominated by a dense stand of sandbar willow *(Salix exigua)*. The wetland contains a small stand of cattails that occurs near the outfall of the culvert and a large willow (probably *Salix gooddingii)* in its center. The site likely receives water at irregular but frequent intervals, depending on the types and frequency of water use in the residential area. Riparian vegetation such as cottonwoods, mulefat, and tamarisk continues downstream from the wetland, although the area also contains upland species such as filaree *(Erodium* sp.) and English elm *(Ulmus procera,* a common landscape tree on the base).

The second wetland is a very small area a few hundred feet to the south of the first one, again dominated by sandbar willow with cattails near the outfall of a residential drainage culvert. The wetland is approximately 30 by 30 feet (0.02 acre). Downstream, cottonwoods occur sparsely for about 150 feet, with creosote and an escaped grass species from the residential area. Water flow at this site also appears to depend on residential use.

The largest of the three wetlands occurs in the northern area of the base in a disturbed drainage ditch near the east side of the crosswind runway. The wetland is divided by a culvert beneath one of the base roads. The wetland is approximately 475 feet long by 20 feet wide on the west side of the road, and approximately 1,420 feet long by 20 feet wide on the east side. Cattails and sedges, including *Scirpus* and probably *Cyperus*, are the dominant species; tamarisk also occurs. The water source appears to be runoff from the vicinity of the runway. The wetland ends prior to another culvert, although the drainage continues northward without hydrophytic vegetation. Mulefat and rubber rabbitbrush are common along the channel north of the wetland area. A few long-dead cottonwoods occur near the northern base boundary, indicating a probable change in the area drainage patterns.

The small reservoir is maintained for irrigation of the golf course. Although it supports cattails around the margin, this is not a jurisdictional wetland because it is a managed water supply.

3.4.6 Cultural Resources

Cultural resources consist of prehistoric and historic sites, structures, districts, artifacts, or any other physical evidence of human activity considered important to a culture, subculture, or community for scientific, religious, traditional, or other reason. For the purposes of this EIS, paleontological remains are also included within the cultural resources category.

The ROI for the analysis of cultural resources includes, minimally, all areas within George AFB boundaries, whether or not certain parcels would be subject to ground disturbance. The potential conveyance of federal property to a private party or non-federal agency constitutes an undertaking, or a project that falls under the requirements of cultural resource legislative mandates, because any historic properties located on that property would cease to be protected by federal law. The ROI also includes those areas designated for potential acquisition under certain proposals that might be disturbed as a direct or indirect result of base reuse. These off-site areas would comprise an additional 2,352 acres under the Proposed Action, and 8,353 acres under the International Airport Alternative.

Numerous laws and regulations require federal agencies to consider the effects of a proposed project on cultural resources. These laws and regulations

stipulate a process for compliance, define the responsibilities of the federal agency proposing the action, and prescribe the relationship among other involved agencies (e.g., State Office of Historic Preservation, the Advisory Council on Historic Preservation). Compliance with requirements of these laws and regulations ideally involves four basic steps: (1) identification of significant cultural resources that could be affected by the Proposed Action or its alternatives, (2) assessment of the impacts or effects of these actions, (3) evaluation of significance of potential historic properties within the ROI, and (4) development and implementation of measures to eliminate or reduce adverse impacts. The primary law governing cultural resources in terms of their treatment in an environmental analysis is the National Historic Preservation Act (NHPA), which addresses the protection of historic and cultural properties. In addition, cultural resources, including paleontological remains, are covered by requirements of NEPA.

All four steps mentioned above will be accomplished, as necessary, for on-base properties within the ROI. The Proposed Action and one alternative, however, have designated considerable off-base areas for acquisition in support of conceptual development plans. These parcels are privately owned and outside Air Force jurisdiction. Record and literature searches were conducted to identify these off-base properties in order to provide the decision-maker with as complete a profile as possible of cultural resources subject to potential impact under each of the reuse alternatives.

Only those potential historic properties determined to be significant under cultural resource legislation are subject to protection or consideration by a federal agency. According to National Register criteria (36 CFR 60.4), the quality of significance is present in districts, sites, buildings, structures, and objects that:

- Are associated with events that have made a significant contribution to the broad patterns of history
- Are associated with the lives of persons significant in the past
- Embody the distinctive characteristics of a type, period, or method of construction; represent the work of a master; possess high artistic value; or represent a significant and distinguishable entity whose components may lack individual distinction
- Have yielded, or may be likely to yield, information important in prehistory or history.

To be listed in or considered eligible for listing in the National Register, a cultural resource must meet at least one of the above criteria and must possess integrity of location, design, setting, materials, feeling, and association. Integrity is defined as the authenticity of a property's historic identity, as evidenced by the survival of physical characteristics that existed during the property's historic or prehistoric occupation or use. If a resource retains the physical characteristics

it possessed in the past, it has the capacity to convey information about a culture or people, historical patterns, or architectural or engineering design and technology. Significant cultural resources, either prehistoric or historic in age, are referred to as "historic properties."

In compliance with the NHPA, the Air Force has conducted the Section 106 consultation process. Record and literature searches were performed at the Archaeological Information Center (San Bernardino County Museum), the National Archives (Pacific Southwest Region), and at George AFB. Results are discussed under the appropriate resource category.

3.4.6.1 Archaeological Resources. Numerous cultural resource surveys have been conducted on George AFB and in its immediate environs. The most recent was performed in November 1990 in support of base closure (SAIC, 1990b). The survey area encompassed approximately 3,500 acres, and covered all areas not subject to present development or major disturbance. Detailed descriptions of the methods, cultural context, findings, recommendations, and related topics are found in *Archaeological Survey and Inventory of George Air Force Base, California* (SAIC, 1990b). This document is incorporated by reference, and is summarized herein for purposes of the analysis.

Three archaeological sites (one prehistoric, one historic, and one of unknown temporal affiliation) were recorded during the 1990 survey. In addition, 13 isolated finds were located. The archaeological sites consisted of:

- A low-density prehistoric lithic scatter
- A rock cairn (unknown temporal affiliation)
- An historic trash dump (circa 1930s).

No archaeological sites eligible for the National Register of Historic Places (NRHP) were identified during the survey. The California State Historic Preservation Officer (SHPO), in their letter of May 28, 1991, concurred with these findings.

The potential for buried archeological deposits is high along the floodplain and first terrace of the Mojave River. Known significant resources lie just outside the boundary of areas designated for potential acquisition. Disclosure of specific locations of cultural resources is prohibited in public documents by 43 CFR 7-18a.

3.4.6.2 Historic Structures and Resources. No evidence of pre-military historic sites or structures has been identified on George AFB. The base, however, was established during World War II, and could reflect the historical development of that era, specifically as it relates to the training of military flight crews.

Because there is a potential for historical significance, World War II buildings were evaluated to determine whether or not they could be considered eligible for the NRHP. Results of that effort are found in the draft *George Air Force Base, California, World War II Buildings/Facilities Architectural and Historical Evaluation* (SAIC and Hatheway Associates, 1991). This document is hereby incorporated by reference and is summarized in this EIS for purposes of analysis.

Four historic structures were thought to be potentially significant following the initial evaluation of George AFB facilities. Upon further investigation, however, the Air Force determined that these properties were not eligible for inclusion in the NRHP. The SHPO concurred with this determination in their letter dated August 7, 1991.

The potential for historic structures and buried historic properties exists in off-base parcels designated for acquisition. Evidence was provided through the records search (Archaeological Information Center, 1991), which examined historic maps and related material. The existence and nature of these sites can only be determined following a reconnaissance survey to be accomplished by the new user prior to reuse development of these areas.

3.4.6.3 Native American Resources. Consultation was initiated with the Native American Heritage Commission to ascertain whether or not any Native American group or individual has concern with or can identify sacred areas within the George AFB environs. This process has produced negative results. Therefore, it is assumed that no area of interest to Native Americans exists within the ROI.

3.4.6.4 Paleontological Resources. No significant paleontological resources have been identified or recorded in the George AFB environs.

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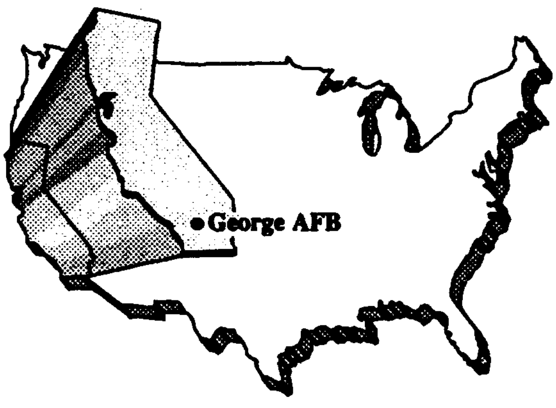


CHAPTER 4
ENVIRONMENTAL IMPACTS

4.0 ENVIRONMENTAL IMPACTS

4.1 INTRODUCTION

This chapter discusses the potential environmental impacts associated with the Proposed Action and alternatives. To provide the context in which potential environmental impacts may occur, discussions of potential changes to the local communities, including population, land use and aesthetics, transportation, and community and public utility services are included in this EIS. In addition, issues related to current and future management of hazardous materials and wastes are discussed. Impacts to the physical and natural environment are evaluated for geology and soils, water resources, air quality, noise, biological resources, and cultural resources. These impacts may occur as a direct result of disposal and reuse activities or as an indirect result caused by changes within the local communities. Cumulative impacts and possible mitigation measures to minimize or eliminate the adverse environmental impacts are also presented.

Cumulative impacts result from "the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time" (CEQ, 1978). Cumulative impacts are discussed by resource in this chapter.

Means of mitigating adverse environmental impacts that may result from implementation of the Proposed Action and alternatives are discussed as required by NEPA. Potential mitigation measures depend upon the particular resource affected. In general, however, mitigation measures are defined in CEQ regulations as actions that include:

(a) Avoiding the impact altogether by not taking an action or certain aspect of the action

(b) Minimizing impacts by limiting the degree or magnitude of the action and its implementation

(c) Rectifying the impact by repairing, rehabilitating, or restoring the affected environment

(d) Reducing or eliminating the impact over time by preservation and maintenance operations during the life of the action

(e) Compensating for the impact by replacing or providing substitute resources or environments.

A discussion of the effectiveness of mitigation measures is included for those resource areas where it is applicable, as in the case of replacement of wildlife

habitat, for example. Where appropriate, an addition to the text regarding the probability of success associated with a particular mitigation has been made.

4.2 LOCAL COMMUNITY

This section discusses potential effects on local communities as a result of disposal and reuse of George AFB.

4.2.1 Community Setting

Socioeconomic effects will be addressed only to the extent that they pertain to the biophysical environment. A complete assessment of socioeconomic effects is presented in the *Socioeconomic Impact Analysis Study*. Employment and population generated by the implementation of the Proposed Action and each alternative are discussed herein. The closure baseline projects employment levels of 50 direct and 18 indirect jobs for the year 1993 to remain constant through 2013 for the No-Action Alternative. Victor Valley population estimates for the closure baseline and post-closure are 196,200 for 1993 and 285,500 for 2013. This represents an increase of approximately 89,300, or 46 percent.

Future reuse of the base is uncertain in its scope, activities, and timing. This EIS addresses these uncertainties by evaluating alternative reuse scenarios intended to encompass the full range of reasonably foreseeable reuses and their environmental impacts.

This analysis recognizes the potential for community impacts arising from "announcement effects" stemming from information regarding the base's closure or reuse. Such announcements may impact the affected communities' perceptions and, in turn, could have important local economic effects. An example would be the in-migration of people anticipating employment under one of the reuse options. If it were later announced that the No-Action Alternative was chosen, many of the newcomers would leave the area to seek employment elsewhere. Such an effect could result in an initial, temporary increase in population followed by a decline in population as people leave the area.

Alternatives are defined for this analysis on the basis of (1) plans of local communities and interested individuals, (2) general land use planning considerations, and (3) Air Force generated plans to provide a broad range of reuse options. Reuse scenarios considered in this EIS must be sufficiently detailed to permit environmental analysis. Initial concepts and plans are taken as starting points for scenarios to be analyzed. Available information on any reuse alternative is then supplemented with economic, demographic, transportation, and other planning data to provide a reuse scenario for analysis. Appendix F describes this scenario development process.

4.2.1.1 Proposed Action. Full conversion of George AFB property for civilian use is estimated to occur over approximately 20 years. The redevelopment of this property into civilian aviation-related, industrial, and commercial uses would cause many changes in the local communities.

It is estimated that the redevelopment activities at George AFB under the Proposed Action would generate approximately 25,400 direct and 25,700 indirect jobs by the year 2013. Figure 4.2-1 provides a comparison of total employment as a result of implementation of the Proposed Action and other alternatives. Direct jobs would be located in Adelanto and Victorville upon disposition of George AFB property, whereas indirect jobs would be created throughout the ROI.

Population impacts in the Victor Valley area under the Proposed Action are estimated to reach approximately 26,600 in 2013. The long-term population change associated with the Proposed Action represents a 9-percent increase over projected 2013 post-closure estimates. Figure 4.2-1 also provides a comparison of population inmigration under the Proposed Action and other alternatives. The majority of inmigrants are expected to locate in the Victor Valley. The communities likely to experience the largest increases in population are Victorville, Adelanto, Hesperia, and Apple Valley. Base redevelopment as a result of the Proposed Action would generate positive economic benefits of increased employment and earnings in the region.

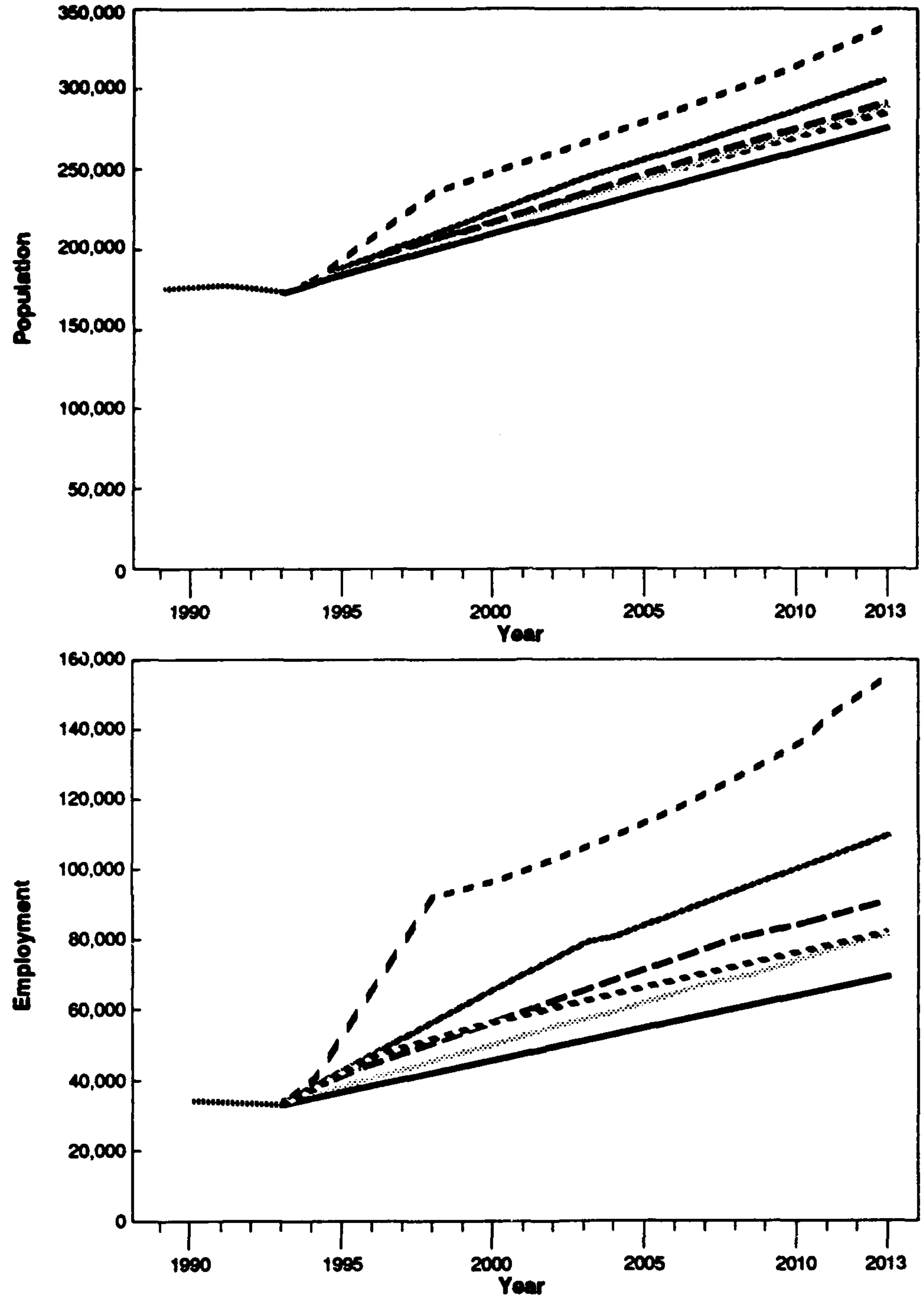
4.2.1.2 International Airport Alternative. The level of economic activity under this alternative would be greater than those reported for the Proposed Action. It is projected that redevelopment of George AFB would generate nearly 54,800 direct and 50,500 indirect jobs in the ROI by the year 2013. These employment figures are considerably higher than those projected for the Proposed Action.

The Victor Valley population impact under this alternative is projected to reach approximately 56,700 in 2013. This represents an approximately 20-percent increase over projected 2013 post-closure estimates.

4.2.1.3 Commercial Airport with Residential Alternative. It is projected that redevelopment of George AFB under this alternative would generate approximately 13,000 direct jobs and 15,200 indirect jobs in the ROI by the year 2013.

The Victor Valley population impact under this alternative is projected to reach 14,100 in the year 2013. This represents an approximately 5-percent increase over projected 2013 post-closure estimates.

4.2.1.4 General Aviation Center Alternative. Redevelopment activities associated with this alternative are expected to generate approximately 8,000 direct and 7,700 indirect jobs in the ROI by the year 2013.



Note: Assumes no announcement effect.

EXPLANATION

- No Action
- Proposed Action
- International Airport
- Non-Aviation
- Commercial Airport
- General Aviation Center
- Preclosure

Comparison of Alternatives-Victor Valley Population and Employment Effect

Figure 4.2-1

The Victor Valley population impact of this alternative is projected to reach approximately 8,500 in the year 2013. This represents an approximately 3-percent increase over projected 2013 post-closure estimates.

4.2.1.5 Non-Aviation Alternative. Redevelopment activities associated with this alternative are expected to generate approximately 8,600 direct and 5,200 indirect jobs in the ROI by the year 2013.

The Victor Valley population impact this alternative is projected to reach 12,500 in the year 2013. This represents an approximately 4-percent increase over the projected 2013 post-closure estimate.

4.2.1.6 Other Land Use Concepts. Full conversion of George AFB property for civilian use will not occur under the federal property transfers and independent land use concepts. These transfers and land use concepts would be initiated on an individual basis and not as part of any integrated reuse alternatives. The potential effects of federal transfers and independent land use concepts will be discussed in relation to their effects on the Proposed Action and/or other reuse alternatives. Only alternatives for which impacts exist are cited, the remainder have insignificant or no impacts.

U.S. Department of Justice. The proposed FCC could directly employ 1,000 persons. The complex could house between 2,000 and 2,750 inmates. This proposal would reduce total direct employment if implemented in conjunction with either the Proposed Action or the International Airport Alternative (2,480 jobs). The FCC would reduce industrial development. This proposal would increase job opportunities by approximately 8 percent if implemented in conjunction with either the Commercial Airport with Residential, the General Aviation Center, or the Non-Aviation alternatives by reducing residential development.

U.S. Department of Interior. This proposal would generate approximately 5 direct jobs and reduce business park usage if implemented in conjunction with the International Airport Alternative. Commercial usage would be reduced if implemented in conjunction with the Proposed Action.

U.S. Department of Housing and Urban Development. No direct jobs would be generated by this proposal and approximately 150 people would be housed. This proposal would result in a net reduction of 677 direct industrial jobs if implemented in conjunction with the Proposed Action and 1,700 direct jobs in conjunction with the International Airport Alternative.

U.S. Department of Education. This proposal would result in 102 direct jobs and a net reduction of 578 commercial jobs if implemented in conjunction with the Proposed Action. A net reduction of 45 business park jobs would occur if

the U.S. Department of Education proposal was implemented in conjunction with the International Airport Alternative.

San Bernardino County Work Furlough Program. This proposal could result in a reduced demand for residential opportunities because of proximity to the inmates. No significant change in employment or population levels are expected from the implementation of this proposed reuse.

Medical Facilities. Use of the base hospital by one of several private medical facilities would cause an increase of 60 on-site jobs. No significant change in employment or population levels are expected from the implementation of this proposed reuse.

4.2.1.7 No-Action Alternative. Under the No-Action Alternative, only caretaker status activities would occur at the base. It is estimated that the caretaker activities at George AFB will maintain approximately 50 direct and 18 secondary jobs in the Victor Valley and elsewhere in San Bernardino and Riverside counties through the year 2013. This represents no increase compared to closure conditions because the No-Action Alternative requires no additional jobs beyond those required at closure. There will be no net increase in population under the No-Action Alternative.

4.2.2 Land Use and Aesthetics

This section discusses the Proposed Action and alternatives relative to land use and zoning to determine potential impacts in terms of land use and aesthetics. Land use compatibility with aircraft noise is discussed in Section 4.4.4.

Figures are included in this section that depict the impacted land uses for the Proposed Action and the alternatives. Table 4.2-1 presents the residential area in acres and the residential population affected by air traffic noise from the Proposed Action and alternatives by each representative year.

4.2.2.1 Proposed Action

Land Use. The land uses associated with implementation of the Proposed Action are generally consistent with the existing land uses for the cities of Adelanto and Victorville, with a few exceptions (Figure 4.2-2). The proposed industrial land use west of the airfield would be incompatible with Adelanto's residential development adjacent to the west base boundary. Within San Bernardino County, one off-base residence and related structures would have to be purchased to accommodate the expansion of the existing north-south airport runway to the north. The remaining land to be acquired for the airport expansion is vacant, undisturbed desert lands.

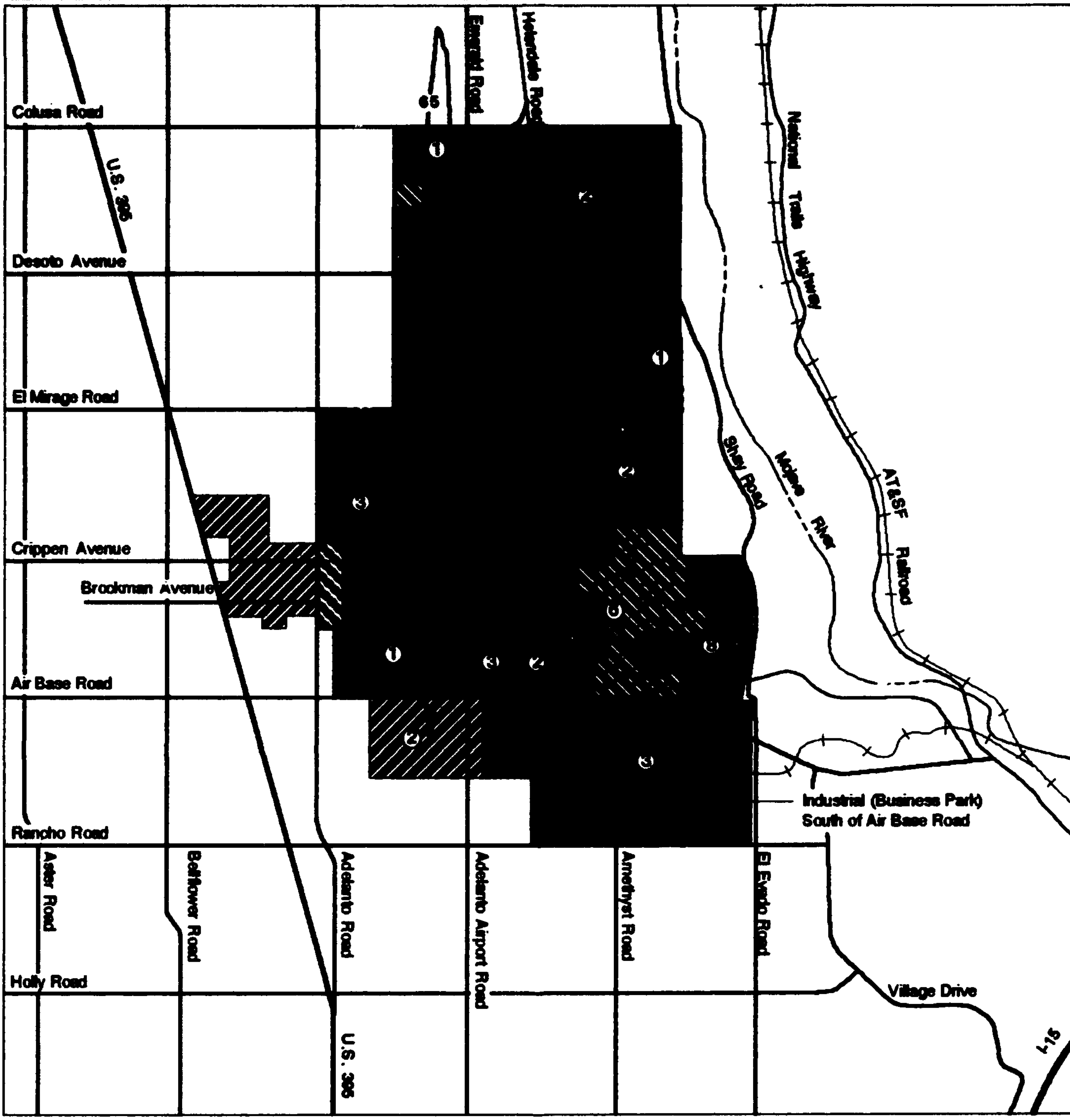
Table 4.2-1. Residential Land Use Noise Exposure for the George AFB Development Plans

Year	Proposed Action and Alternatives	Total Acres Within Noise Contour 65 DNL Range	Approximate Population Exposed 65 DNL Range and Greater
1993	Proposed Action*	552	0
	International Airport Alternative	0	0
	Commercial Airport with Residential Alternative*	551	0
	General Aviation Alternative	13	0
1998	Proposed Action	751	0
	International Airport Alternative	4,758	64
	Commercial Airport with Residential Alternative	750	0
	General Aviation Alternative	36	0
2003	Proposed Action	836	0
	International Airport Alternative	8,149	293
	Commercial Airport with Residential Alternative	837	0
	General Aviation Alternative	69	0
2013	Proposed Action	920	0
	International Airport Alternative	5,696	128
	Commercial Airport with Residential Alternative	920	0
	General Aviation Alternative	117	0

*Only airline training operations would be conducted in this year.

Once an airport layout plan has been approved for the Proposed Action, a study will need to be conducted in accordance with FAR Part 150. The FAR Part 150 study implements portions of Title I of the Aviation Safety and Noise Abatement Act of 1979. The impacts identified in the FAR Part 150 study may require mitigation to reduce adverse effects of airfield operations on surrounding land uses or protect future land uses from conflicts.

Zoning. The Proposed Action is generally consistent with the residential and industrial zoning presently in place in the cities of Adelanto and Victorville regulating areas surrounding George AFB property, with three exceptions. Presently the land within the city of Adelanto to the east of the north end of the north-south runway is zoned manufacturing/industrial (M/I) and would thus need to be rezoned to airport development park for runway expansion to the east. In addition the city of Adelanto's zoning sphere of influence coincides with the expansion to the north and Adelanto, through its zoning powers could control the expansion of the airport. The existing residential zoned land in the city of Adelanto due west of the south end of the diagonal runway, north of Brockman



EXPLANATION

- Land Use Conflict
- Zoning Conflict
- 1 Airfield
- 2 Aviation Support
- 3 Industrial
- 4 Institutional* (Medical)
- 5 Institutional* (Education)
- 6 Commercial (Office/Business Park)
- 7 Residential*
- 8 Public/Recreation
- 9 Agriculture*
- 10 Vacant Land*
- Slopes>15%
- Noise Contour
- * Not Applicable
- Base Boundary
- Abandoned Runway

0 1/4 1/2 1 Mile

Land Use Conflicts-Proposed Action

Figure 4.2-2

Avenue, would conflict with the proposed airport flight paths. The proposed aviation support land use south of Air Base Road, within the city of Adelanto, is presently zoned M/I and would thus need to be rezoned. The Proposed Action will generate reduced noise contours from preclosure. Therefore, the zoning impacted by these contour changes can be modified by the jurisdictions surrounding the base.

General Plans. The Proposed Action is consistent with the city of Adelanto's Interim General Plan (The Planning Center, 1990a) since the entire area to the west and north of George AFB is proposed as an ADD. In addition, the area to the south of the base, within the city of Adelanto, is proposed for M/I reuse district, which would be compatible zoning for the anticipated noise impacts associated with the airport operations.

The Proposed Action is consistent with the city of Victorville's General Plan (Cotton, Beland and Associate, Inc., 1988) since industrial (business park) is proposed south of Air Base Road and the adjacent land within the city of Victorville is proposed for compatible light industrial uses. From midway between Air Base Road and Turner Road on the east side of George AFB, the proposed land use is rural residential (2-5 dwelling units per acre) which is compatible with the proposed on-base public recreation reuse on the eastern portion of the base.

The Proposed Action is inconsistent with the San Bernardino County General Plan (1989). The land within the county's jurisdiction to the north is proposed for low density residential. With the expansion to the north of the airport, the plan would need to be modified to include airport uses. However, the General Plan land uses to the east of the base in the county's jurisdiction is consistent, since this is proposed agricultural use.

Aesthetics. On-base adverse effects on features of medium visual sensitivity are not expected as a result of implementation of the Proposed Action. No visual effects to the golf course are expected because its reuse would continue in the same activity and the surrounding area would remain as open space. Within the city of Adelanto, the implementation of the Proposed Action would cause minor off-base visual effects because most of the new development would be readily visible from surrounding major roads and highways, such as U.S. 395, Air Base Road, and Shay Road. There would be no aesthetic impacts to the city of Victorville.

Cumulative Impacts. *There would be no cumulative impacts to land use and aesthetics.*

Mitigation Measures. Mitigation measures may be implemented by the city of Adelanto and San Bernardino County to minimize off-base impacts resulting from the Proposed Action. The current inhabitants of the off-base residence

located near the north-south runway would need to be relocated according to the applicable federal and state relocation statutes. The city of Adelanto and county of San Bernardino will need to revise zoning regulations and the airfield safety areas. These safety areas need to be modified to reflect new FAA requirements. Architectural design standards and landscaping requirements can be implemented to minimize the visual impacts of on-base industrial uses, especially regarding the residential area adjacent to the west base boundary located within the city of Adelanto.

4.2.2.2 International Airport Alternative

Land Use. The overall impacts related to land use especially in the city of Adelanto would be significantly greater than under the Proposed Action, because it includes the acquisition of approximately 8,350 acres of off-base property, which includes urban and rural development in the city of Adelanto. This property, to be used for the development of an international airport, is about 3-1/2 times the amount of off-base property to be acquired under the Proposed Action. It will change the character of Adelanto and vicinity. The one major impact of the international airport will be the relocation of significant portions of Adelanto's population and related commercial facilities.

The on-base land use conflicts caused by implementation of this alternative would include the existing residential area that would be converted to commercial reuse (i.e., hotel park). However, the off-base land use impacts under the International Airport Alternative would be greater than those of the Proposed Action since a large number of existing inhabitated structures will need to be acquired with the residents being relocated. The acquisition of approximately 1,000 acres southwest of George AFB (bounded by Air Base Road on the south, U.S. 395 on the west, El Mirage Road on the north, and the west base boundary) will require the purchase of approximately 400 acres of urban development that currently include 458 residences. In addition, this area contains 2 apartment complexes, 23 commercial establishments, 4 churches, and 2 government facilities that would need to be acquired and demolished. The acquisition of approximately 7,350 acres northwest of George AFB (bounded by El Mirage Road, U.S. 395, Tesoro Road, Emerald Road, and the northwest base boundary) would require the purchase of 15 houses and 16 modular houses. In addition, an automobile wrecking yard and a horse ranch would have to be acquired. The remainder of the privately owned desert land is presently vacant.

A major portion of the residential development in Adelanto to the southwest of crosswind Runway 03/21 would be impacted by the 65 DNL noise contour associated with the airport operations (see Table 4.2-1). This area is generally single family residences with some multi-family residences and commercial uses along U.S. 395.

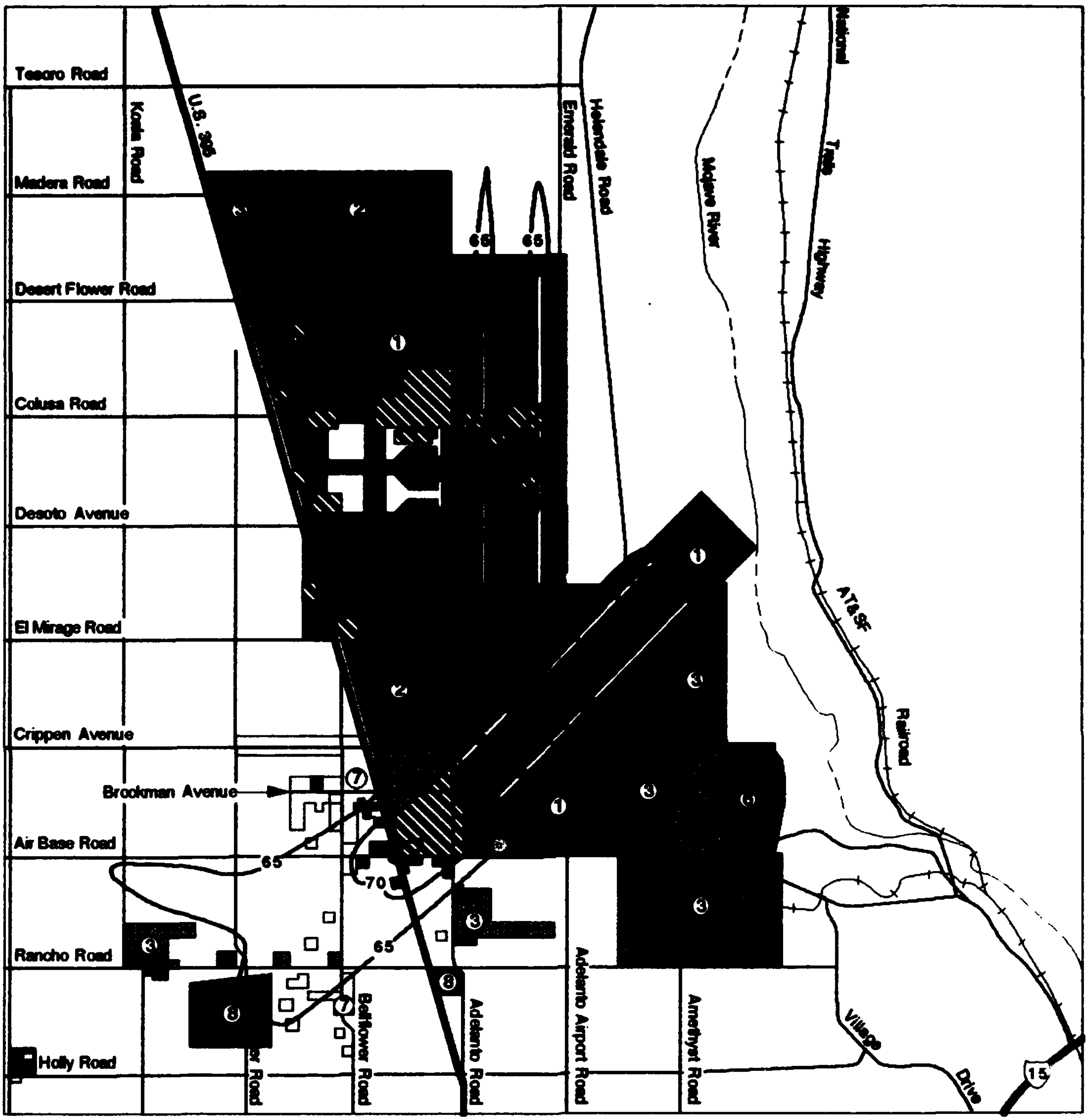
Zoning. The International Airport Alternative is inconsistent with Adelanto's present zoning in the area between U.S. 395 and base property north of Air Base Road. This land is currently zoned for residential industrial, and commercial uses, however, this would be insignificant in that the zoning could be revised for airport development as indicated in Adelanto's Interim General Plan (The Planning Center, 1990a). This alternative would also be inconsistent with Adelanto's zoning in an area from Adelanto Road east 5 miles and from 0.5 mile south of Rancho Road on the south to one half mile north of Air Base Road on the north side. This area is within the 65 DNL contour, and is presently zoned for residential uses (see Table 4.2-1). Figures 4.2-3 through 4.2-5 depict the land uses impacted by airport associated noise.

General Plans. The General Plan impacts of the International Airport Alternative are the same as for the Proposed Action (Section 4.2.2.1, General Plan).

Aesthetics. The on-base aesthetic effects caused by implementation of the International Airport Alternative would be the same as for the Proposed Action. The off-base aesthetic effects within the city of Adelanto would be especially visible from existing U.S. 395, because the western boundary of the new international airport terminal and related facilities would adjoin the highway. This area is currently either residential, with some commercial uses, or open desert land. Once the airport is developed, the area along U.S. 395 would become urbanized with parking, buildings, and the typical related appurtenances such as street lights and directional signals to the east of the highway. The significant aesthetic impact will be the urbanization of essentially vacant desert lands that will occur within the city of Adelanto as a result of the international airport.

Cumulative Impacts. There would be no cumulative impacts to land use and aesthetics.

Mitigation Measures. No on-base mitigation measures would be required under the International Airport Alternative. The off-base mitigation measures in the city of Adelanto required for implementation of this alternative would be substantial. The current inhabitants in the off-base residential areas and businesses would have to be relocated according to the applicable federal and state relocation statutes. The city of Adelanto will need to enact zoning to regulate development within the off-base airfield safety zones resulting from the 65 DNL noise contours. In addition, Adelanto's existing residential/commercial zoning for the area west of the base to U.S. 395 would have to be revised to accommodate airport development.



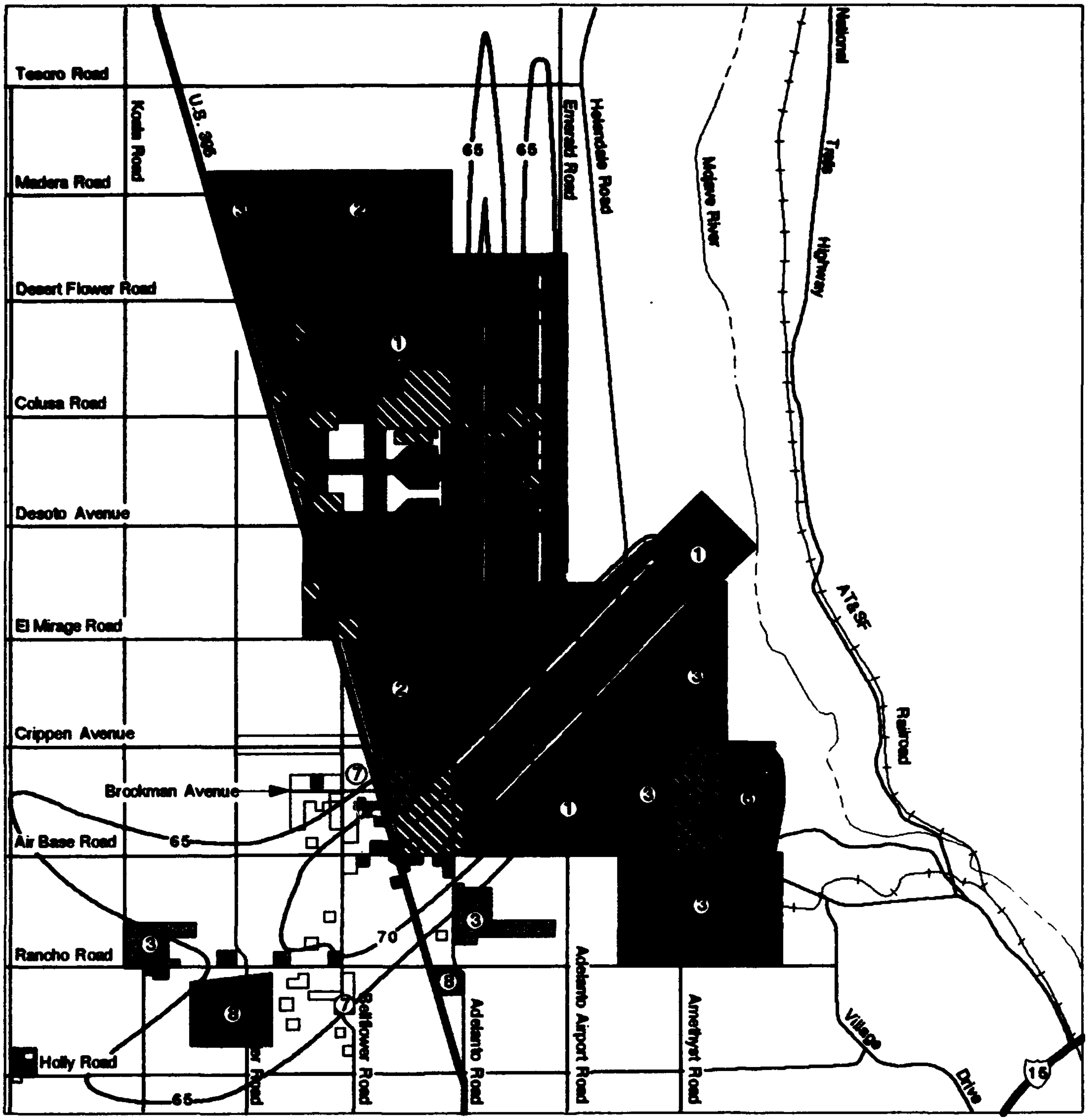
EXPLANATION

- Land Use Conflict
- Zoning Conflict
- 1 Airfield
- 2 Aviation Support
- 3 Industrial
- 3 Industrial Aviation
- 3 Industrial-Business Park
- 4 Institutional* (Medical)
- 5 Institutional (Education)
- 6 Commercial
- 7 Residential
- 8 Public/Recreation
- Base Boundary
- Noise Contour
- * Not Applicable

0 1750 3500 7000 Feet

Land Use Conflicts-International Airport Alternative (1998)

Figure 4.2-3



EXPLANATION

- Land Use Conflict
- Zoning Conflict
- ① Airfield
- ② Aviation Support
- ③ Industrial
- ③ Industrial Aviation
- ③ Industrial-Business Park
- ④ Institutional* (Medical)
- ⑤ Institutional (Education)
- ⑥ Commercial
- ⑦ Residential
- ⑧ Public/Recreation
- Base Boundary
- Noise Contour
- * Not Applicable

0 1750 3500 7000 Feet

Land Use Conflicts-International Airport Alternative (2003)

Figure 4.2-4

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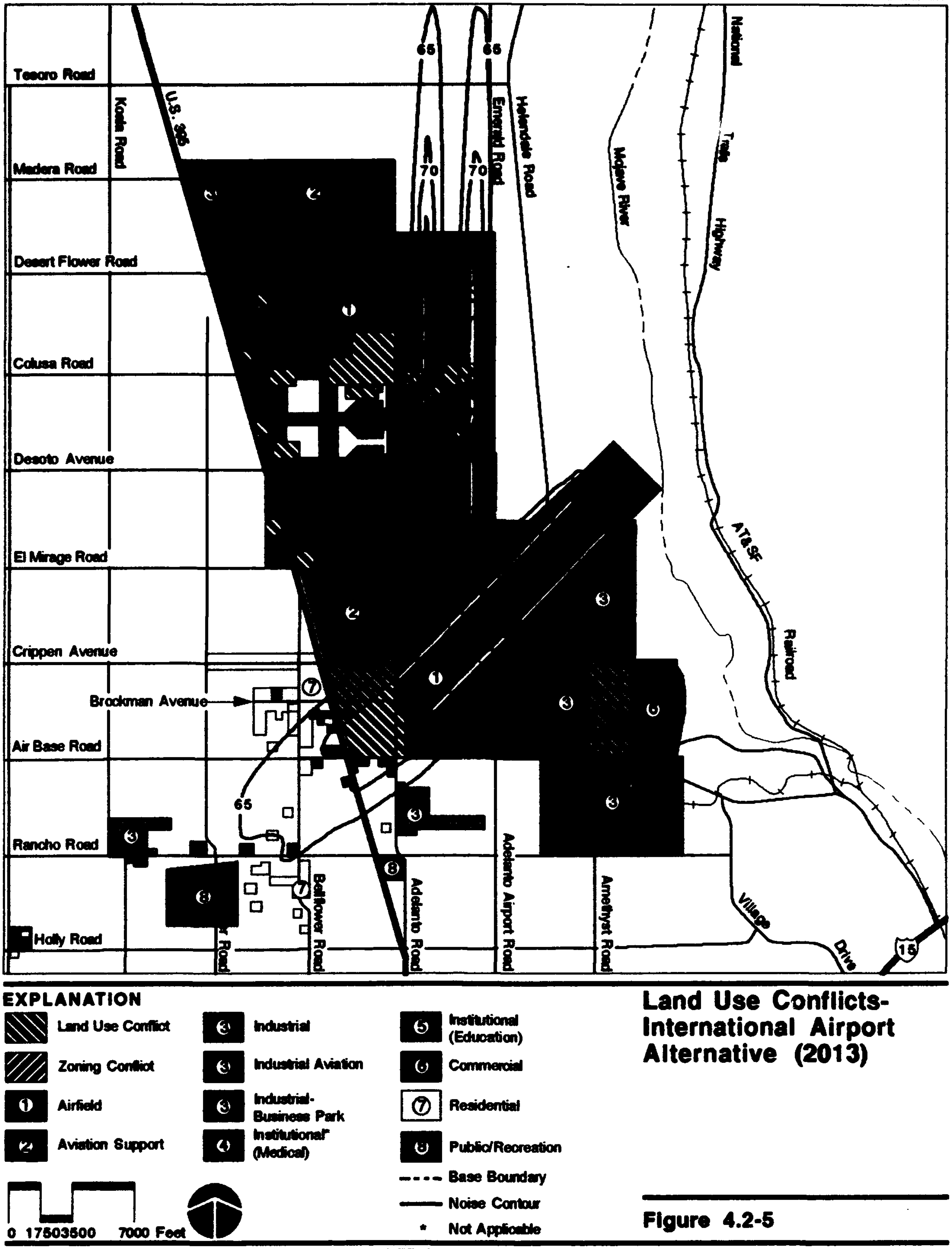


Land Use Conflicts-International Airport Alternative (2013)

Figure 4.2-5

4.2.2.3 Commercial Airport with Residential Alternative

Land Use. The on-base land uses associated with the Commercial Airport with Residential Alternative are consistent with the land uses adjacent to the base in the cities of Adelanto and Victorville, with the exception of the proposed on-base industrial land use west of the airfield. This industrial use would be incompatible with Adelanto's residential development that is adjacent to the west base boundary, north from Air Base Road to Brockman Avenue.

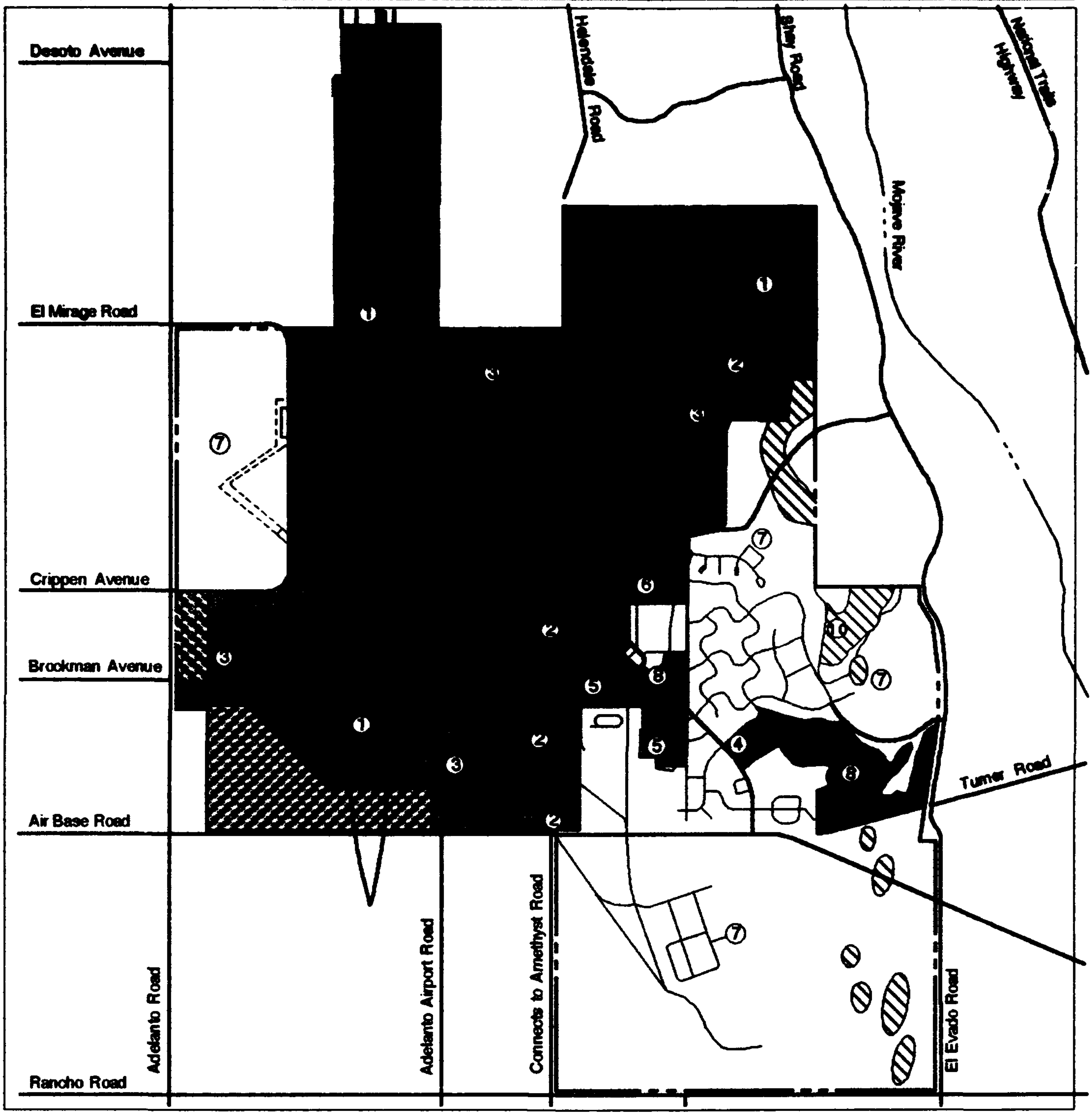
Zoning. This alternative is generally consistent with existing zoning in the city of Adelanto except for the proposed industrial use within the city boundary (in the southwest corner of the base) that would conflict with the currently zoned OS-PL (Figure 4.2-6). This area would need to be rezoned for industrial use before this development could occur. The city of Adelanto and county of San Bernardino would need to revise zoning regulations within the airfield safety areas.

General Plans. The Commercial Airport with Residential Alternative is consistent with the city of Adelanto's Interim General Plan (The Planning Center, 1990a) to the north, however, to the south the proposed on-base residential area south of Air Base Road would be adjacent to land designated for industrial uses. This alternative is inconsistent with the San Bernardino County General Plan (1990c) since the plan identifies rural living north of the base. This area would include lands impacted at the north end of the north-south runway, by 65 DNL (see Table 4.2-1). This alternative is also inconsistent with the city of Victorville's General Plan (Cotton, Beland and Associate, Inc., 1988) in that their plan identifies industrial uses adjacent to George AFB south of Air Base Road on the south and east sides. On base the land use is residential and, therefore, it would be surrounded by industrial uses. The San Bernardino County ALUC would need to modify the Airport Hazards portion of the General Plan because of the reduced noise footprint in the area at the north end of the north-south runway that is within county jurisdiction.

Aesthetics. The Commercial Airport with Residential Alternative is not expected to have any on-base adverse effects on features of medium visual sensitivity. Some impact to features of low visual sensitivity within the city of Adelanto are anticipated, because of the proximity of the industrial and residential areas.

Cumulative Impacts. There would be no cumulative impacts to land use and aesthetics.

Mitigation Measures. The city of Adelanto and county of San Bernardino would need to modify zoning to regulate development within the new/revised airfield safety areas and noise contours to mitigate this impact. Architectural design standards and landscaping requirements would have to be implemented in the city of Adelanto, to minimize the visual impacts of the on-base industrial



EXPLANATION

- Land Use Conflict
- Zoning Conflict
- ① Airfield
- ② Aviation Support
- ③ Industrial
- ④ Institutional (Medical)
- ⑤ Institutional (Education)
- ⑥ Commercial
- ⑦ Residential
- ⑧ Public/Recreation
- ⑨ Agriculture*
- ⑩ Vacant Land
- Slopes>15%

0 750 1500 3000 Feet

- Noise Contour
- * Not Applicable
- Base Boundary
- Abandoned Runway

Land Use Conflicts-Commercial Airport with Residential Alternative

Figure 4.2-6

uses, which are close to the off-base residential area to the west. The city of Victorville would either need to revise the General Plan (Cotton, Beland, and Associate, Inc., 1988) to compatible uses adjacent to the base or would need to insure that screening be provided between the industrial and proposed on-base residential uses.

4.2.2.4 General Aviation Center Alternative

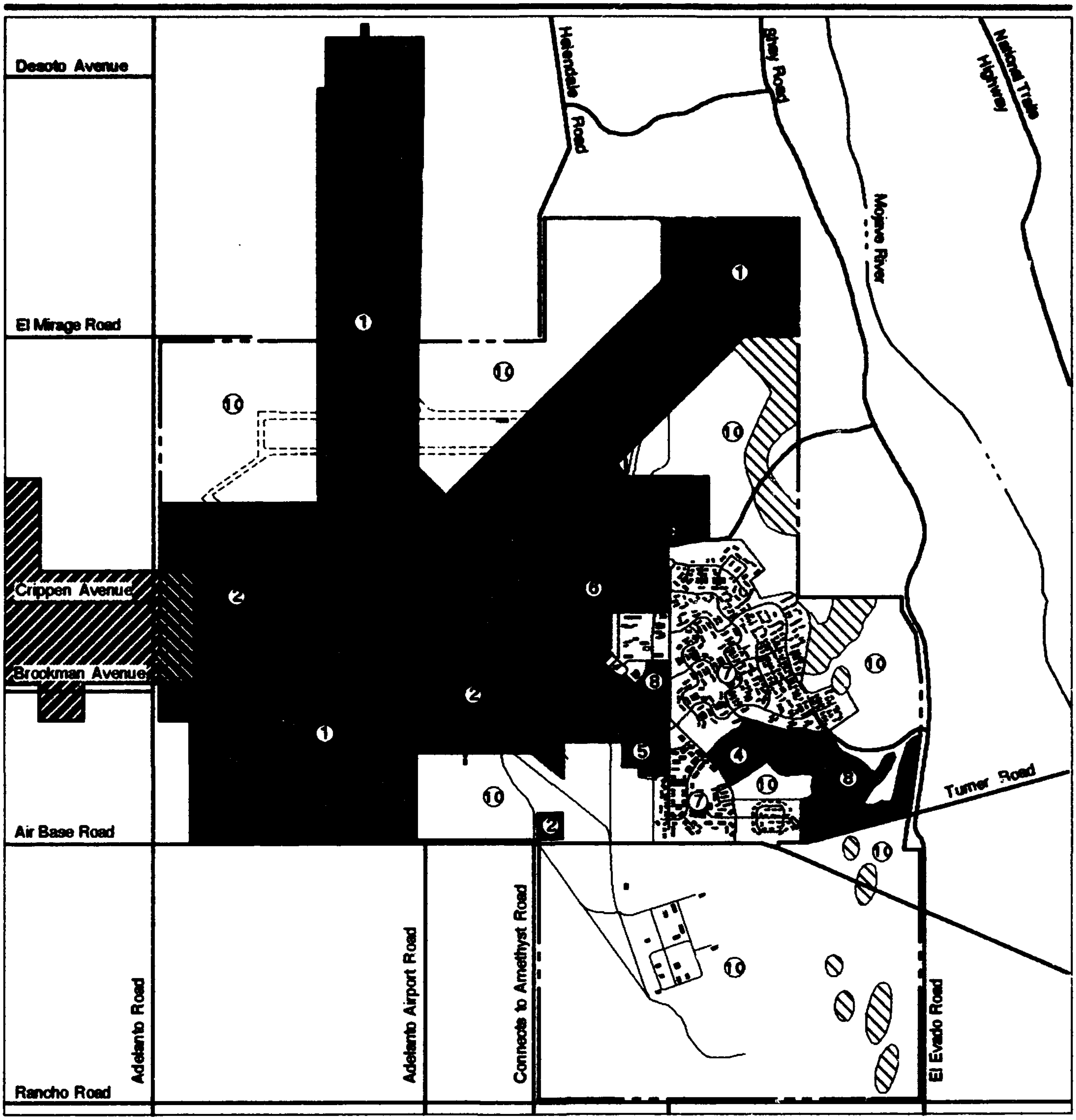
Land Use. The land uses associated with implementation of the General Aviation Center Alternative are generally consistent with the existing land uses since on-base land uses would be similar to preclosure uses. The effects of this alternative on the surrounding land use would also be similar to the Commercial Airport with Residential Alternative.

The major difference between the General Aviation Center Alternative and the other alternatives is that the reuses are greatly reduced. All reuse development proposed is on base in existing developed areas with open space areas for which redevelopment is not proposed. The only exception is a small portion of the southwestern corner of the base, which will be reused for a storage area for aircraft (aviation support). This proposed aviation support land use would be incompatible with Adelanto's residential development that is adjacent to the west base boundary and would require visual separation by a fence or landscaping (Figure 4.2-7).

Zoning. The General Aviation Center Alternative is generally consistent with the residential and industrial zoning presently in place in the cities of Adelanto and Victorville and San Bernardino County regulating areas surrounding George AFB property. The only conflict is with Adelanto's zoning due west of the south end of the crosswind runway. The proposed on-base use is aviation support whereas the adjacent land in Adelanto is zoned single family residential (R-1) and multifamily residential (R-3).

General Plans. The General Aviation Center Airport would greatly reduce noise contours as compared to the other airport plans. No contour of 65 DNL would occur outside of the airfield. Therefore, current restrictions pertaining to noise impacts could be modified to allow residential development with the aviation safety areas as identified in the San Bernardino County General Plan (1989).

Aesthetics. On-base adverse effects on features of medium-visual sensitivity are not expected as a result of implementation of the General Aviation Center Alternative. The on-base areas that are undeveloped will generally remain as undeveloped land. No visual effects to the golf course are expected because its reuse would continue in the same activity and the surrounding area would again remain undeveloped.



EXPLANATION

- Land Use Conflict
- Zoning Conflict
- ① Airfield
- ② Aviation Support
- ③ Industrial *
- ④ Institutional (Medical)
- ⑤ Institutional (Education)
- ⑥ Commercial
- ⑦ Residential
- ⑧ Public/Recreation
- ⑨ Agriculture*
- ⑩ Vacant Land
- Slopes>15%

0 750 1500 3000 Feet

Noise Contour
Base Boundary
* Not Applicable
Abandoned Runway

Land Use Conflicts-General Aviation Center Alternative

Figure 4.2-7

The implementation of the General Aviation Center Alternative would cause only minor off-base visual effects because there is a very limited new development that would not be readily visible from surrounding major roads and highways, such as U.S. 395, Air Base Road, and Shay Road.

Cumulative Impacts. There would be no cumulative impacts to land use and aesthetics.

Mitigation Measures. Mitigation measures may be implemented by the city of Adelanto to minimize off-base impacts resulting from the General Aviation Center Alternative. Architectural design standards and landscaping requirements can be implemented to minimize the visual impacts of on-base aviation support land use west of the airfield to the adjacent residential area in the city of Adelanto.

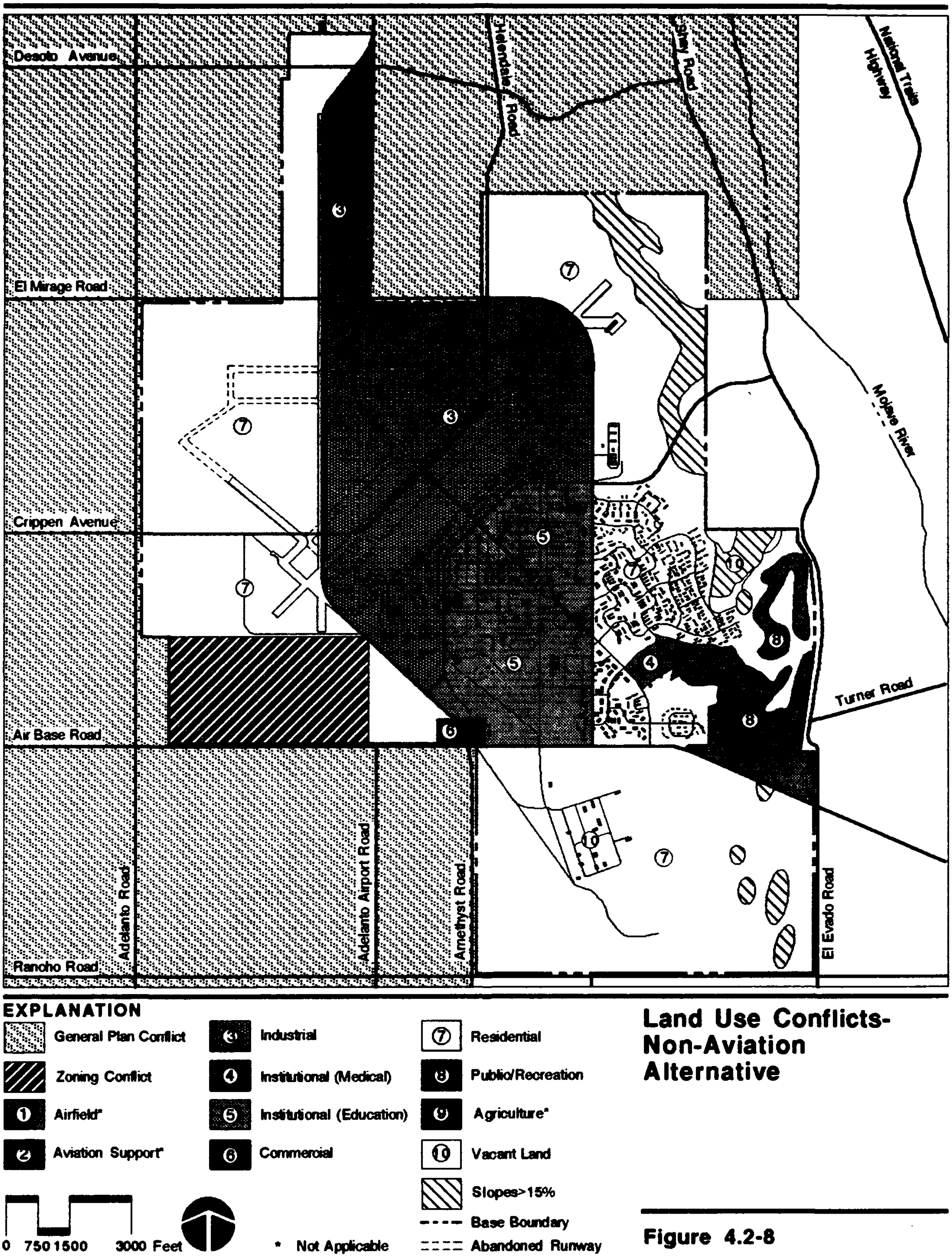
4.2.2.5 Non-Aviation Alternative

Land Use. Because the airfield would not be operational under the Non-Aviation Alternative, industrial and residential land uses can be expanded on base. The airfield would be converted for industrial uses, utilizing the existing runways and aprons for parking and open-air storage yards. The development of residential uses in the vacant areas of the base would essentially become residential in character. Adjacent residential areas would be impacted by the elimination of the adverse effects of airfield operations (Figure 4.2-8).

Zoning. The planned Non-Aviation Alternative is generally consistent with zoning, with the exception of the proposed residential development within the boundaries of the city of Adelanto. This area, in the southwest corner of the base, is currently zoned OS-PL and would need to be rezoned for residential development.

General Plans. The Non-Aviation Alternative on base residential use is consistent with the San Bernardino County General Plan (1990c) in that rural living (RL-5) residential uses are shown north of the base with the exception being the on-base industrial use on the east and north boundary of the base from Desoto Avenue south to El Mirage Road that adjoins the off-base RL-5 district.

This alternative is inconsistent with the city of Adelanto's interim General Plan (The Planning Center, 1990a) in that it identifies airport development district to the north and east of the base. Adjacent to this area the land use on base is to be residential. The other inconsistency with Adelanto's plan is the industrial use south of Air Base Road that is adjacent to on-base residential uses.



Land Use Conflicts-Non-Aviation Alternative

Figure 4.2-8

Aesthetics. The Non-Aviation Alternative is not expected to result in any adverse effects on features of medium visual sensitivity.

Portions of the on-base industrial development would be visible from the proposed residential areas, where adjacent, and would need to be visually screened to avoid undesirable views. However, overall, the Non-Aviation Alternative is not expected to significantly affect the visual and aesthetic quality of the base. Some open portions of the base, especially the areas south of Air Base Road and northwest of the cantonment, would be developed. They would, therefore, be transformed from open space to an urban environment.

Cumulative Impacts. There would be no cumulative impacts to land use and aesthetics.

Mitigation Measures. Minor mitigation measures may be implemented for the Non-Aviation Alternative. Where industrial zoning is adjacent to the base in the cities of Adelanto and Victorville, measures will need to be taken to visually screen views from the residences into the industrial areas. The city of Adelanto would need to rezone that portion of the base presently for residential use. The cities of Adelanto and Victorville would need to revise their General Plans to be compatible with the proposed on-base uses.

4.2.2.6 Other Land Use Concepts. Impacts of each proposed federal transfer and other independent land use concepts are evaluated for compatibility with land use plans and regulations, impacts to on- and off-base land uses, and general land use trends in the region.

U.S. Department of Justice

Land Use and Zoning. The proposed transfer would necessitate a change in category from vacant or industrial use to institutional. The new land use would be compatible with Adelanto's manufacturing/industrial zoning to the east. Victorville adjoins the base to the south and west. The Victorville General Plan (Cotton, Beland and Associate, Inc., 1988) indicates the proposed zoning to be light industrial, and thus compatible with an FFC.

Aesthetics. This federal transfer is not expected to have any adverse effects on any visually sensitive areas.

U.S. Department of Interior

Land Use and Zoning. This would result in no change from current land use and would be consistent with local zoning and land use.

Aesthetics. Transfer of the base recreational facilities will have no significant impact on aesthetics.

U.S. Department of Transportation

Land Use and Zoning. This reuse would be compatible with land use and zoning associated with the implementation of the Proposed Action or alternatives, except for the Non-Aviation Alternative. The garage would be compatible because it would be located in either aviation support, business park, or commercial reuse areas. However, it would not be compatible in the Non-Aviation Alternative because it would be located within the institutional area. In the short term, the garage could probably be accommodated in the institutional area, because the institutional reuse would develop over a longer time period.

Aesthetics. The transfer of the Automotive Hobby Shop to the U.S. DOT will not result in significant visual impacts.

U.S. Department of Education

Land Use and Zoning. This transfer would be consistent with all proposed uses except for those associated with the Proposed Action and the International Airport Alternative. Although the schools could be retained in either of these plans, there are no residential reuses proposed. Therefore, the schools would be isolated in an incompatible commercial or business park development. San Bernardino County requests three or more unspecified existing facilities. Potential reuse would be compatible with land use and zoning in the local area.

Aesthetics. The transfer of existing facilities to the Adelanto School District or San Bernardino County would not result in significant visual impacts because the use of these facilities would not change significantly.

U.S. Department of Housing and Urban Development

Land Use and Zoning. The continued use of (Alaska Circle Community) as housing would have no effect on current land uses. The limited number of units (60 residences) would, however, be isolated from other residential areas under the land uses associated with the Proposed Action and the International Airport Alternative. Demolition of the residential units is proposed under each of these reuse alternatives.

Aesthetics. No new construction is proposed for this transfer and, therefore, no significant visual impacts are anticipated.

San Bernardino County Work Furlough Program

Land Use and Zoning. This proposal would be compatible with land use under all reuse plans except the Proposed Action and the International Airport Alternative. Within these two plans there are no provisions for any type of

residential reuse. However, in the short term, the International Airport Alternative would retain the residential areas and, therefore, this reuse would initially be compatible. The remaining alternatives retain the dormitories, which could be used for the San Bernardino County Work Furlough Program.

Aesthetics. Reuse for inmate housing is proposed for the dormitories. No substantial change in function or new construction is proposed; therefore, no significant visual impacts are anticipated.

Medical Facilities

Land Use and Zoning. This reuse would be compatible with land uses associated with the Proposed Action and alternatives, because it would not result in a change from current land uses.

Aesthetics. Conveyance of the base hospital would have no significant visual or aesthetic impacts.

4.2.2.7 No-Action Alternative

Land Use. The No-Action Alternative would cause no physical changes in on-base land use. Functionally, there would be no use of base land or facilities. DMT personnel would continue to maintain the buildings and grounds. Because the federal government would retain ownership of the base under the No-Action Alternative, the property would remain outside the jurisdiction of the local communities and the county. The No-Action Alternative would have beneficial effects with respect to off-base land use. Residential areas southwest of the base, which are currently exposed to high noise levels from airfield activities, would no longer experience noise impacts.

The No-Action Alternative would not affect the ultimate requirement to remediate hazardous waste sites on base, but it would reduce the urgency of cleanup. As long as the sites were stabilized and did not present a danger to off-base areas and natural resources, remediation could be delayed.

Zoning. As long as the base remained unused, there would be no apparent conflict with local zoning or land uses.

General Plans. Permanent base closure, however, would be inconsistent with local reuse plans.

Aesthetics. The No-Action Alternative is not expected to significantly affect the visual and aesthetic quality of the base or the surrounding area. Some landscaped portions of the base would receive less intensive maintenance. The absence of human activity on the base would enhance and accelerate the return to natural conditions in some areas.

Cumulative Impacts. The No-Action Alternative would have no cumulative impacts on land use and aesthetics.

Mitigation Measures. There would be no land use impacts as a result of the No-Action Alternative. Therefore, no mitigation measures would be required.

4.2.3 Transportation

The effects of the Proposed Action and alternatives on each component of the transportation system are presented in this section. Mitigation measures are suggested for those components likely to experience substantial and adverse changes under any or all of these alternatives.

Project-generated effects of the various alternatives on road traffic were assessed by estimating the number of trips generated from on-site employment and residential use projected for each reuse alternative. Non-project generated trips were calculated from changes in the Victor Valley area population associated with each alternative. Taking into account total trips and road-segment capacity, LOS changes on key road segments were computed for each alternative (see Table 3.2-1 for definitions). Changes in work and, therefore, travel patterns, were derived by assigning workers to, or removing workers from, the most direct commuting routes.

The reuse of George AFB under the Proposed Action and each of the alternatives (except No-Action) would lead to increased use of local roads and highways, especially in the vicinity of Adelanto and Victorville. Traffic volumes on community roadways would continue to increase through the year 2013. Air Base Road is the only roadway that currently provides direct access onto George AFB (by way of the Main Gate and the Housing Gate). For analytical purposes in this study, Air Base Road is divided into two parts: Air Base Road East and Air Base Road West. Traffic from the base to Victorville and I-15 would use Air Base Road East, and traffic from the base to Adelanto would use Air Base Road West. Construction and renovation of on-site facilities are projected to take place throughout the study period. Effects of construction worker traffic have been added to the effects of traffic generated by potential on-base operations workers and visitors to the base area. U.S. 395 and Village Drive are also important to base generated traffic because they provide direct connections to Air Base Road.

Changes in the volume of peak-hour traffic on key community roads that are not the result of project-generated traffic are assumed to be consistent with changes projected for Victor Valley population without the project. U.S. 395 would have the greatest non-project-generated traffic because it would start with a greater baseline volume in the year 1993. It would operate at LOS D even without base-generated traffic. It would have a peak-hour volume of about 1,770 vehicles by the year 2013, not including project-generated traffic.

The airspace analysis examines the type and level of aircraft operations projected for the Proposed Action and Alternatives and compares them to how the airspace was configured and used under the preclosure reference. The same constraints and considerations were assumed as existed during preclosure, such as terrain, runway configurations, and other airport and airway traffic. Full use of the R-2508 airspace complex by DOD would continue. Both the Proposed Action and the International Airport Alternative assumed the continued availability of radar coverage for the base to ensure optimum safety and efficiency of air traffic control operations. The impact analysis considers the relationship of the projected aircraft operations to the operational capacity of the airport, using criteria that have been established by the FAA for determining airport service volumes. Potential effects on airspace use were assessed, based on the extent to which the Proposed Action or alternatives could (1) require modifications to the airspace structure or air traffic control systems and/or facilities; (2) restrict, limit, or otherwise delay other air traffic in the region; or (3) encroach on other airspace areas and uses.

The FAA is ultimately responsible for evaluating the specific effects the reuse of an airport will have on the safe and efficient use of navigable airspace by aircraft. Such a study is based on details from the airport proponent's Airport Master Plan and consists of an airspace analysis, a flight safety review, and a review of the potential effect of the proposal on air traffic control and air navigational facilities. Once this study is completed, the FAA can then determine the actual requirements for facilities, terminal and enroute airspace, and instrument flight procedures.

The Southern California Association of Governments (SCAG) recently completed the Southern California Aviation System Study Update (SCAG, 1991). This study indicates that air passenger demand in Los Angeles, Orange, Riverside, and San Bernardino counties will exceed 88 MAP in the year 2000. The constrained capacity (air space, noise, and ground access restraints on airport capacity) of existing airports in those counties will be only 63.3 MAP. This means that up to 24.7 MAP will have to be accommodated at new airports in the region. Therefore, reuse of George AFB for air passenger service under any of the aviation alternatives would be able to absorb part of the projected excess demand with minimal effect on passenger loads at existing airports.

It is assumed here that the effects of the alternative reuses of George AFB on ridership at the Victorville AMTRAK station will change (increase) in proportion to population changes induced by each alternative.

4.2.3.1 Proposed Action

Roadways. In addition to Air Base Road East, Air Base Road West, U.S. 395, and Village Drive, three other roadways are assumed to provide future access to the base area. They are Shay Road to the east, Helendale Road to the north,

and El Mirage Road to the west (see Figure 3.2-8). It is projected that only about 25 percent of the base-generated traffic under the Proposed Action would use the latter three roads.

The roadways identified for this study as key community roads and the percentage of base-generated traffic they are projected to carry are: Air Base Road East (33), Air Base Road West (15), U.S. 395 (8), Village Drive (19), Shay Road (10), El Mirage Road (10), and Helendale Road (5). The City of Victorville General Plan Circulation Map proposes that Amethyst/Cobalt Road be improved to major arterial status with 100 feet of right-of-way (City of Victorville, 1990). This road would provide direct access to Air Base Road and the Main Gate area from the south and would relieve considerable traffic congestion on Air Base Road and Village Drive.

Traffic generation for a variety of land uses has been analyzed for the Proposed Action. The major generator would be the 11,850 office park employees projected to use about 612 acres of land on the base by the year 2013. Other land uses include commercial aviation (about 1 million passengers annually), general aviation (approximately 22,200 flights annually), aviation support, golf course (20 employees), and parks and vacant land (30 employees).

Effects of Project Generated Traffic on Key Community Roads. The number of daily trips generated by each type of proposed land use, in addition to construction workers, was estimated based upon Proposed Action projections for number of passengers, general aviation flights, employees, and dwelling units, depending upon the particular land use proposed. Table 4.2-2 shows the distribution of the AADT generated by the Proposed Action operations and construction workers on each of the key community roads for each of the study years through the year 2013. In the peak construction year of 2003, only about 3.1 percent of the traffic would be generated by construction workers. In making these projections it was assumed that Air Base Road, U.S. 395, and Village Drive would be used in the same proportions that they are currently used by persons generating trips at George AFB. Assumptions made for the percentage of base-generated traffic that would use each of the defined key community roads are cited previously.

The most important key community road would be Air Base Road East, which would carry about 31,600 daily trips generated by the Proposed Action by 2013. Air Base Road West would receive about 14,400 trips, U.S. 395 about 7,700 trips, Village Drive about 18,200 trips, Shay Road about 9,600, El Mirage Road about 9,600, and Helendale Road about 4,800 trips that year. By the year 2013, the Proposed Action is projected to generate about 95,900 trips daily. This is about 5.3 times the approximately 18,000 trips generated by the base in 1990 (Victor Valley Economic Development Authority, 1990b), and substantially higher than the estimated caretaker status of about 180 trips per day (50 DMT employees at 3.6 trips per day each).

Table 4.2-2. Projection of Annual Average Daily Traffic (AADT) on Key Community Roads Generated by the Proposed Action (Operations and Construction Workers)

Roadway	1993[a]	1998	2003	2013
Air Base Road East				
Operations	90	10,304	20,788	31,483
Construction	0	650	673	164
Total	90	10,954	21,461	31,647
Air Base Road West				
Operations	50	4,684	9,449	14,311
Construction	0	295	306	75
Total	50	4,979	9,755	14,386
U.S. 395				
Operations	20	2,498	5,040	7,632
Construction	0	158	163	40
Total	20	2,656	5,203	7,672
Village Drive				
Operations	20	5,933	11,969	18,127
Construction	0	374	387	94
Total	20	6,307	12,356	18,221
Shay Road				
Operations	0	3,123	6,299	9,540
Construction	0	197	204	50
Total	0	3,320	6,503	9,590
El Mirage Road				
Operations	0	3,123	6,299	9,540
Construction	0	197	204	50
Total	0	3,320	6,503	9,590
Helendale Road				
Operations	0	1,561	3,150	4,770
Construction	0	98	102	25
Total	0	1,659	3,252	4,795
Totals				
Operations	180	31,226	62,994	95,403
Construction	0	1,969	2,039	498
Total	180	33,195	65,033	95,901

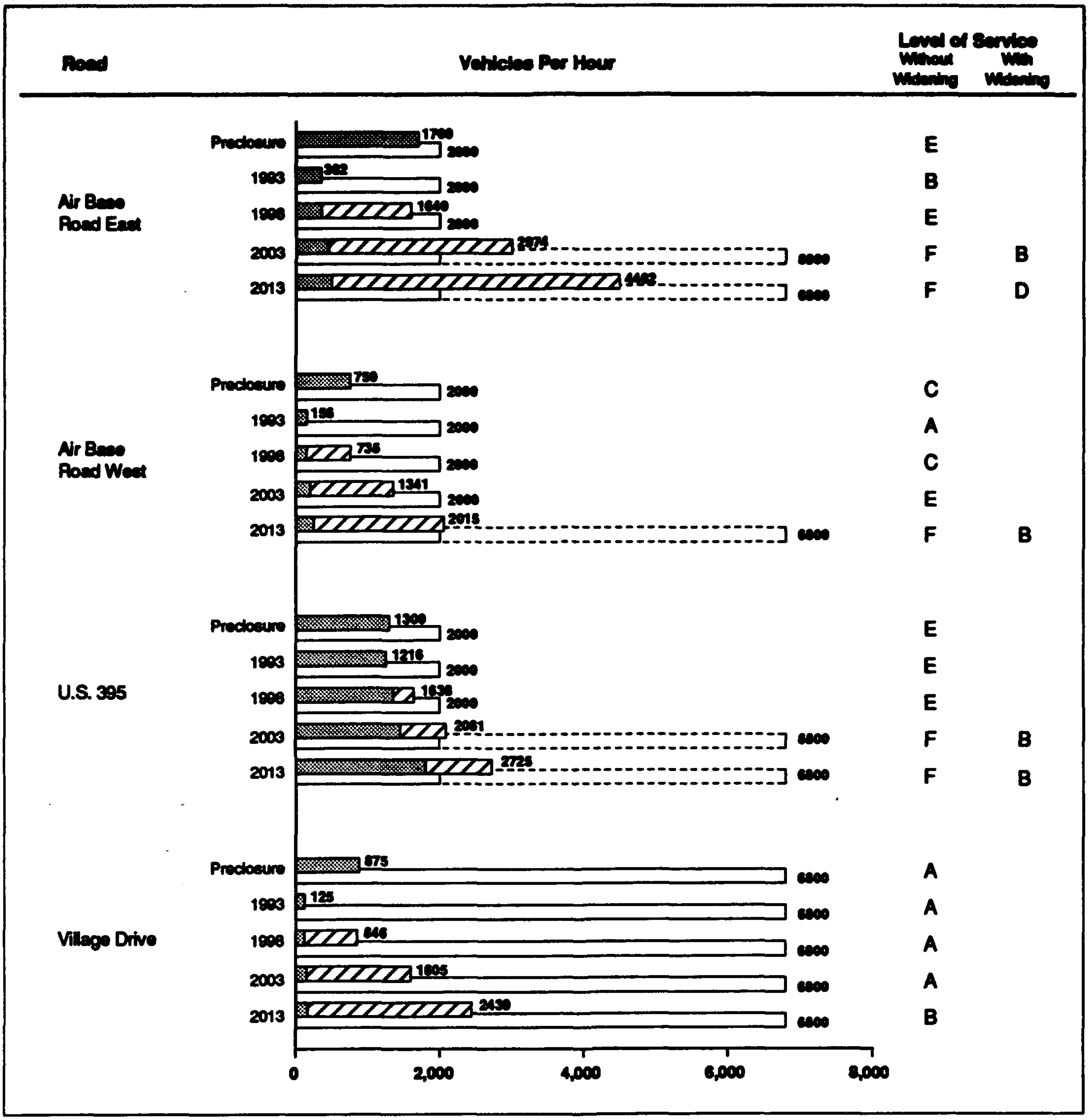
Note: (a) Disposal Management Team

Figures 4.2-9a and b show project- and non-project-generated peak-hour traffic for the years 1990, 1993, 1998, 2003, and 2013 (the latter four being the project study years) for each of the seven key community roads. Air Base Road East and U.S. 395 would realize the greatest peak-hour traffic loads. Those two roadways would realize peak-hour traffic of about 4,500 and 2,700 vehicles respectively by the year 2013. These loads are far in excess of present capacity and would require improvements and widening to accommodate the anticipated peak-hour traffic.

Summary of Effects on Key Community Roads. Figures 4.2-9a and b also show the projected LOS for each key community road. Air Base Road East would be most affected by the Proposed Action. To avoid falling to LOS F, it would be necessary to widen Air Base Road East to 4 lanes by 1999. Air Base Road West and U.S. 395 would have to be widened to 4 lanes by the years 2012 and 2001, respectively. No improvements would be required to maintain LOS E or better on the other key community roads.

Effects on Key On-base Roads. It is assumed for the Proposed Action that existing on-base roads would remain in place and that additional roads would be constructed to accommodate new land uses west of the airport, and south of Air Base Road. It is apparent from the Proposed Action land use map that the majority of the traffic generated by industrial uses would use on-base roads that are not yet built. Peak-hour traffic generated by office park, aviation support, residential, and other minor uses would use existing on-base roads. The distribution of this traffic is projected to be similar to that of the present time. In 1994, the first year of operation, Cory Boulevard's peak-hour volume would reach 880 under the Proposed Action; its LOS would be level D. With its four-lane section, however, Phantom Street would maintain an acceptable LOS of A through the year 2013, when its peak-hour volume would reach only about 780.

Airport Capacity. Aviation activities identified under the Proposed Action include air passenger service, corporate and private flying (general aviation), and other related aviation activities, such as aircraft maintenance and airline training. These operations could include a variety of aircraft ranging from helicopters and small, single engine propeller-type aircraft to large, passenger jets, such as B-747s and DC-10s. The projected number of flight operations and the fleet mix associated with the Proposed Action are shown in Table 4.2-3. FAA standards (FAA, 1983) were utilized to determine the Annual Service Volume (ASV), as a reasonable estimate of the airport's operational capacity based on the existing runway configuration, fleet mix, weather conditions, etc., that would be encountered in 1 year. Projected operations were then compared to the ASV to determine if the airport capacity can meet forecasted demands. Under the Proposed Action, the ASV would range from approximately 265,000 operations in 1993 to 215,000 operations by the year 2013. This reduction is attributable to the variety of aircraft operating at the airport in later

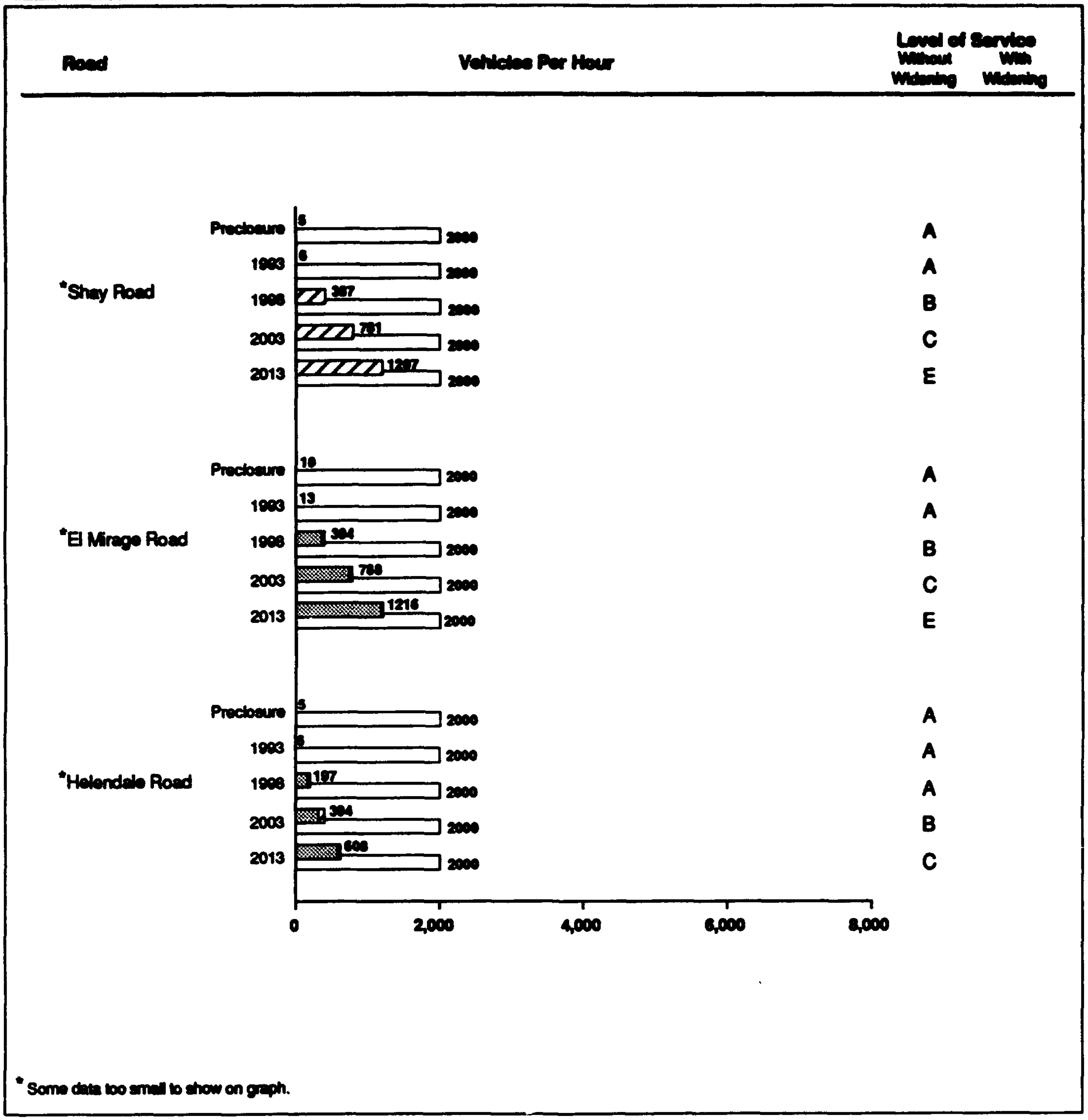


EXPLANATION

- Non-Project Generated Traffic
- Project Generated Traffic
- Capacity
- Future Capacity

Peak-Hour Traffic Volumes on Key Community Roads- Proposed Action

Figure 4.2-9a



EXPLANATION

Non-Project Generated Traffic

Project Generated Traffic

Capacity

Future Capacity

Peak-Hour Traffic Volumes on Key Community Roads-Proposed Action

Figure 4.2-9b

Table 4.2-3. Projected Aviation Forecast - Proposed Action

	Average Annual Operations			
	1993	1998	2003	2013
Aviation Category				
Air Passenger	0	18,200	21,300	23,100
Aircraft Maintenance	0	1,600	2,600	4,000
Airline Training	10,000	10,000	10,000	10,000
General Aviation	0	23,800	30,800	38,900
Total Operations	10,000	53,600	64,700	76,000
Fleet Mix (Percent of Total Operations)				
Helicopter	0	2	2	3
Piston Engine	0	40	42	44
Turboprop	0	31	29	23
Narrow Body Jet	0	8	11	16
Wide Body Jet	100	19	16	14

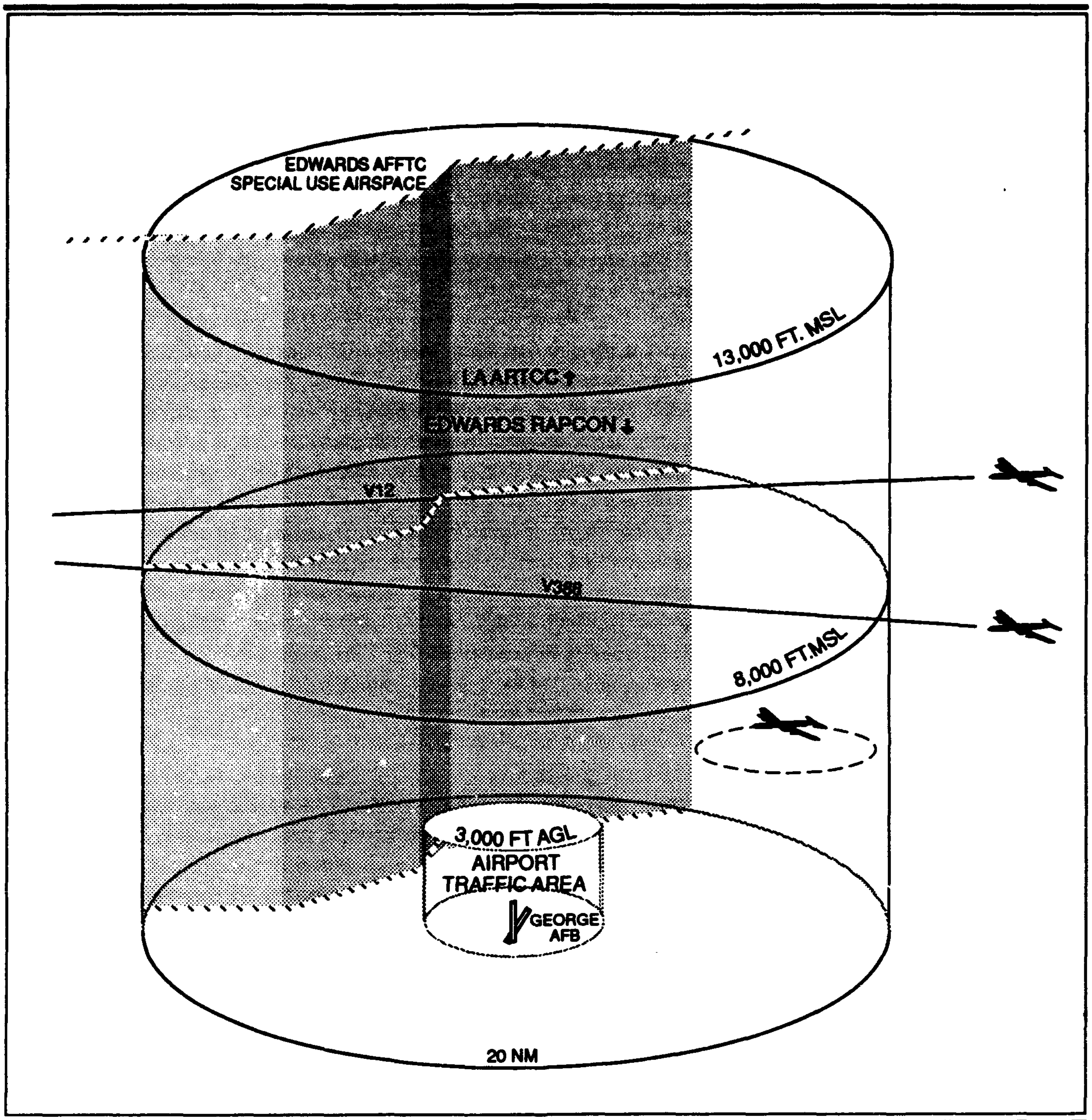
Source: P&D Technologies, 1990.

years, which could increase time spacing intervals for runway operations. Because forecasted operations represent only about 35 percent of the ASV by 2013, no capacity constraints would be expected.

Airspace/Air Traffic. The Proposed Action and this analysis assume that the same type of radar coverage and navigational aids would be provided for the airport, as existed prior to base closure, in order to maintain an equivalent level of terminal ATC services for the reuse aviation activities. However, the continuation of such coverage and services would depend on whether the existing radar system is retained or replaced, with a remote link established to the Edwards FAA RAPCON facility. A VOR navigational aid with DME would also have to replace the military TACAN system, which is not compatible with civil airborne equipment. The existing ILS is compatible with civil aircraft instrumentation and could either be retained or replaced to maintain this approach capability. The decision to install these radar and navigational systems would depend on operational needs and availability of funds, as determined by the FAA and airport development authority.

Airspace requirements under the Proposed Action should be the same as those in effect under the preclosure baseline (see Figure 3.2-12), with the airspace designated as the Ground Controlled Approach Area permanently absorbed by the Edwards FAA RAPCON. The Proposed Action identifies a requirement for a control tower which, along with navigational aids, would require that an airport traffic area, control zone, and transition area be established to provide protective airspace for airport traffic and instrument flight procedures.

Figure 4.2-10 illustrates a vertical profile of the airspace structure for the George AFB ROI and those elements that could potentially constrain or be constrained by reuse aviation activities. The Edwards FAA RAPCON controls airspace over George AFB at 13,000 feet MSL and below, including the V12 and V386 airways,



George AFB Airspace Environment within Region of Influence

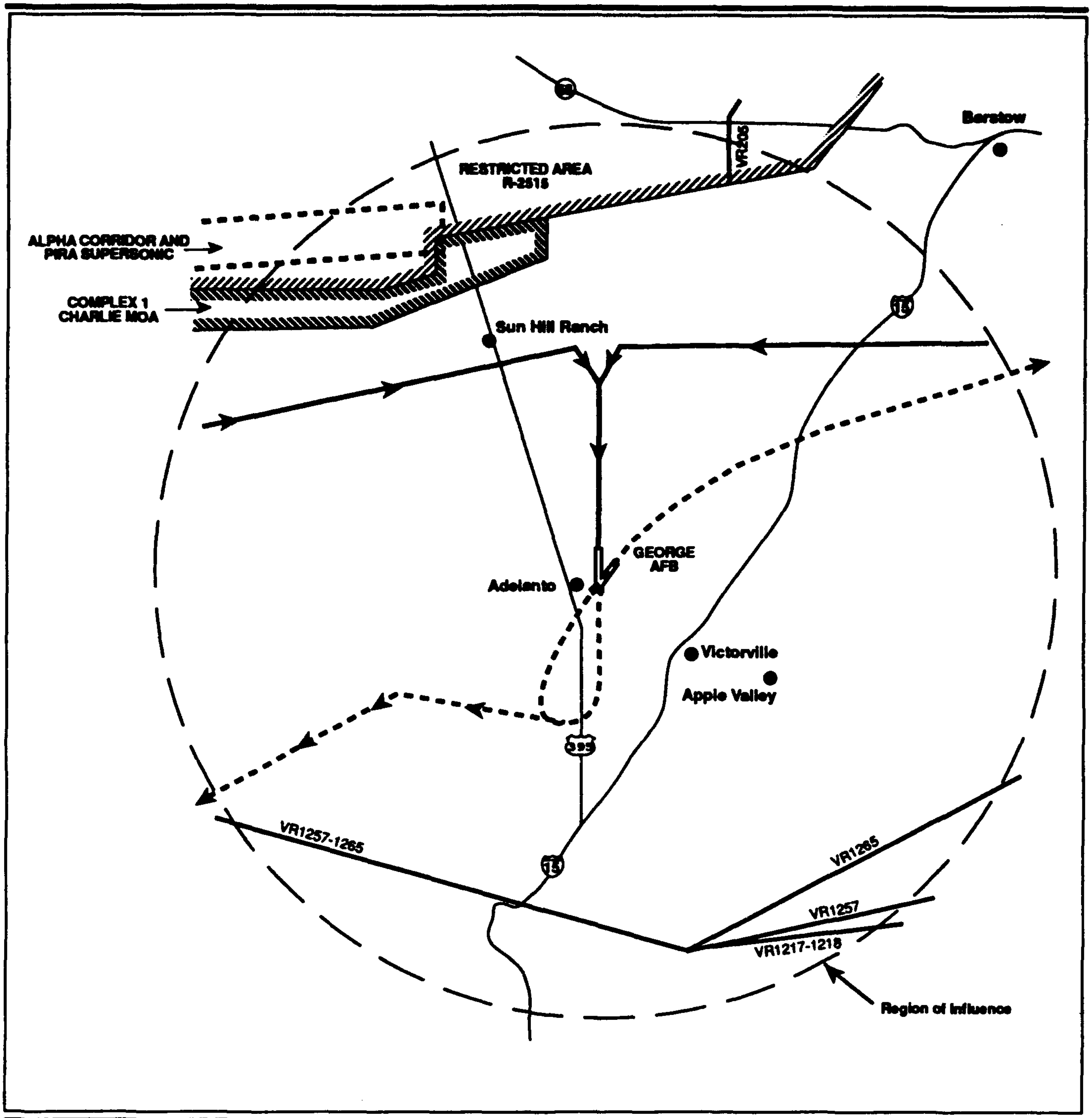
Figure 4.2-10

on which traffic transits at altitudes of 8,000 feet MSL and above. The Los Angeles ARTCC handles enroute traffic above this airspace above 13,000 feet MSL. The FAA RAPCON is also responsible for military flight operations within the full lateral and vertical limits of the R-2508 Complex airspace. The airspace of R-2515 is delegated by FAA RAPCON to Edwards Military Radar Unit for control of all flight operations within R-2515. Air traffic control would, therefore, require sufficient maneuvering airspace to separate and sequence simultaneous instrument arrivals and departures at George AFB without conflicting with other airspace uses.

Civil aircraft approaching or departing George AFB could be routed to remain 3 nm south of the Complex 1 Charlie MOA and R-2515 boundaries when this airspace is active. Based on preclosure experience with military cargo aircraft (C-5s and C-141s), large air-carrier type aircraft could be routed directly to the airport (visual approach) or to an ILS approach commencing 8 to 10 miles north of Runway 17 without encroaching on R-2515 airspace. Aircraft departures could also be routed via standard instrument procedures (SIPs) or as otherwise directed by Edwards FAA RAPCON to remain clear of this airspace. Figure 4.2-11 illustrates the potential instrument arrival and departure flight tracks for Runway 17, which is used nearly 75 percent of the year because of prevailing wind directions. Edwards FAA RAPCON could generally provide individual aircraft handling for the level of operations projected under the Proposed Action, as traffic workload permitted.

VOR/DME instrument approach procedures, similar to the preclosure low TACAN procedures depicted on Figures 3.2-14 and 3.2-15, may be viable for Runway 17/35 with holding patterns and arcing flight tracks that would not affect other airspace uses in the ROI. The FAA is responsible for designing and flight checking such procedures and would have to examine alternatives that could minimize conflict with these other airspace uses. These published procedures are required for use when the air traffic control radar system is inoperative and can assist in expediting the traffic flow and alleviate airspace congestion, as necessary, during peak traffic operations. Aircraft remaining in a rectangular radar traffic pattern for successive ILS approaches, such as for airline training, could remain within 10 nm of the airfield, which was accomplished in preclosure conditions for military practice approaches (see Figure 3.2-13). VFR operations, which would primarily include the general aviation aircraft, would normally fly directly to and from the airfield.

The number of annual operations projected by the year 2013 represents nearly a 50-percent increase over preclosure military operations. However, about half of these projected operations may be conducted by general aviation aircraft, which would place less demand on the ATC and airspace systems than did the military operations. While additional airspace could be used compared to the closure baseline, it would appear that these operations could be accommodated within the ROI. It is also not likely that the Proposed Action



EXPLANATION

- Military Operations Area
- Restricted Area
- Arrival Routes
- Departure Routes

0 2.5 5 10 Nautical Miles

Projected Instrument Arrival and Departure Routes for Runway 17

Figure 4.2-11

would affect or be affected by the closure and reuse of Norton AFB and associated aircraft realignment actions at March AFB due to the manner in which the FAA has segregated its ATC airspace jurisdiction of the FAA's Radar Approach Control at Ontario Airport, which does not overlap the ATC airspace allocated to the Edwards FAA RAPCON.

It should be noted that if the existing or a replacement radar system is not provided as assumed for the Proposed Action, the ATC capacity for handling instrument aircraft operations at George AFB would be greatly reduced. Other FAA radar antenna systems in the region do not provide coverage below 4,500 feet MSL in the Victor Valley area. Therefore, non-radar ATC procedures would be required for operations below 4,500 feet MSL, which would increase the sequencing and separation standards that would have to be applied by the Edwards FAA RAPCON. Similarly, if no navigational aid capability was provided for the base, this airfield could be restricted to VFR operations only, which is not normally conducive to air carrier operational requirements.

Air Transportation. The commercial airport identified under the Proposed Action would have a long-term (year 2013) passenger volume of approximately 1 MAP, with capabilities of handling up to 15 MAP although passenger volume could increase substantially beyond the 2013 study horizon. This passenger volume represents approximately 19 percent of the 1990 passenger traffic through Ontario International Airport (5.4 MAP), and 8 percent of the long-term projected traffic at Ontario (12 MAP).

The SCAG recently completed forecasts of air passenger demand in Southern California for the years 2000 and 2010 (SCAG, 1991). Regional total air passenger demand was projected at approximately 90 MAP in the year 2000 and 118 MAP in the year 2010. These forecasts are substantially greater than the 58.7 MAP total of 1988. The commercial airport identified under the Proposed Action would meet part of this unsatisfied demand for air travel. Other regional airports are expected to continue operating at or above capacity. Air cargo shipments through the commercial airport under the Proposed Action can be expected to help meet the growing demand for air freight capacity projected by SCAG through the year 2010 (SCAG, 1991).

The existing private airports in the Victor Valley may not suffer a loss of patronage with the introduction of general aviation at the George AFB airport because, unless accommodations are better and/or fees are less, private aircraft owners would have little reason to leave the airport they are now using. As new private aircraft are introduced to the Victor Valley, their owners might be more inclined to use the new facilities at the George AFB airport. The Proposed Action assumes that about 120 general aviation aircraft could be expected to be based at George AFB by the year 2013 (P & D Technologies, 1990). Based on standard ratios, they would produce about 60 flights (departures) per day.

Railroad Transportation. With the introduction of industrial uses at George AFB, the existing rail spur right-of-way extending east from the base about 2 miles to the Union Pacific/AT&SF line could be expected to be reconstructed to accommodate freight traffic. Depending upon the type of industrial uses developed at the base, the rail spur could be expected to serve one to five trains per week. The freight that could be developed by the Proposed Action would be very small compared to the total amount that presently uses the Union Pacific/AT&SF line in that area.

Ridership on the AMTRAK system out of Victorville is expected to increase in proportion to population increases in the Victor Valley. Under these circumstances, with the Proposed Action, annual ridership at the Victorville AMTRAK station would increase by about 58.4 percent from 4,600 to about 7,300 by the year 2013.

Cumulative Impacts. The proposed realignment of U.S. 395 would have the mitigating effect of reducing roadway congestion and improving LOS. Air Force base closure and realignment activities in the region (Norton, March, and Edwards AFBs) are not expected to have an impact on traffic generation in the Victor Valley area.

Mitigation Measures. No mitigation measures would be required for any of the transportation components.

4.2.3.2 International Airport Alternative

Roadways. In addition to Air Base Road East, Air Base Road West, U.S. 395, and Village Drive, two other roadways are assumed to provide future access to the base area. They are Desert Flower and El Mirage roads to the west (see Figure 2.3-1). Based on land use arrangements, it is projected that about 50 percent of the project-generated traffic under the International Airport Alternative would use Desert Flower and El Mirage roads.

The roadways identified for this study as key community roads and the percentage of base-generated traffic they are projected to carry are: Air Base Road East (10), Air Base Road West (5), U.S. 395 (33), Village Drive (12), Desert Flower Road (20), and El Mirage Road (20). The City of Victorville General Plan Circulation Map proposes that Amethyst/Cobalt Road be improved to major arterial status with 100 feet of right-of-way (City of Victorville, 1990). This road would provide direct access to Air Base Road and the Main Gate area from the south and would take considerable congestion off Air Base Road and Village Drive.

Traffic generation for five types of land uses has been analyzed for the International Airport Alternative. The most important traffic generators would be the nearly 530 acres of hotel park area that could support nearly 26,000 resort

hotel rooms, and the airport terminal on the west side of the project area, with its projected 25 MAP by the year 2013. Between them, these two land uses would generate over 210,000 daily trips by the year 2013.

Effects of Project Generated Traffic on Key Community Roads. The number of daily trips generated by each type of proposed land use, in addition to construction workers, was estimated for the operations period based upon the International Airport Alternative projections for number of passengers, hotel rooms, and acres of office/business park. Table 4.2-4 shows the distribution of the AADT generated by the International Airport Alternative operations and construction workers on each of the key community roads and for each of the study years through the year 2013. In the peak construction year (2013) only about 1.3 percent of the traffic would be generated by construction workers. In making these projections it was assumed that Air Base Road, U.S. 395, and Village Drive would be used in the same proportions that they are currently used by persons generating trips at George AFB.

Desert Flower and El Mirage roads would carry about 62,200 daily trips each generated by this alternative by 2013. Air Base Road East would receive about 31,500 trips, Air Base Road West about 15,700 trips, U.S. 395 about 101,200 trips, and Village Drive about 37,200 trips that year. By the year 2013, the International Airport Alternative is projected to generate about 310,100 trips daily (including non-project generated traffic). This is about 17 times the approximately 18,000 trips generated by the base in 1990 (VVEDA, 1990b), and substantially higher than the estimated caretaker status of about 180 trips per day (50 DMT employees at 3.6 trips per day each).

Figures 4.2-12a and b show project- and non-project-generated peak-hour traffic for the years 1990, 1993, 1998, 2003, and 2013, for each of the key community roads. U.S. 395 would have a peak-hour traffic volume of about 13,600 by the year 2013. By that year U.S. 395 is expected to achieve freeway status. Desert Flower and El Mirage roads would realize the next greatest peak-hour traffic loads. Those two roadways would realize peak-hour traffic of about 7,200 vehicles each by the year 2013. These loads far exceed their present capacity and improvements and widening would be required to accommodate anticipated peak-hour traffic.

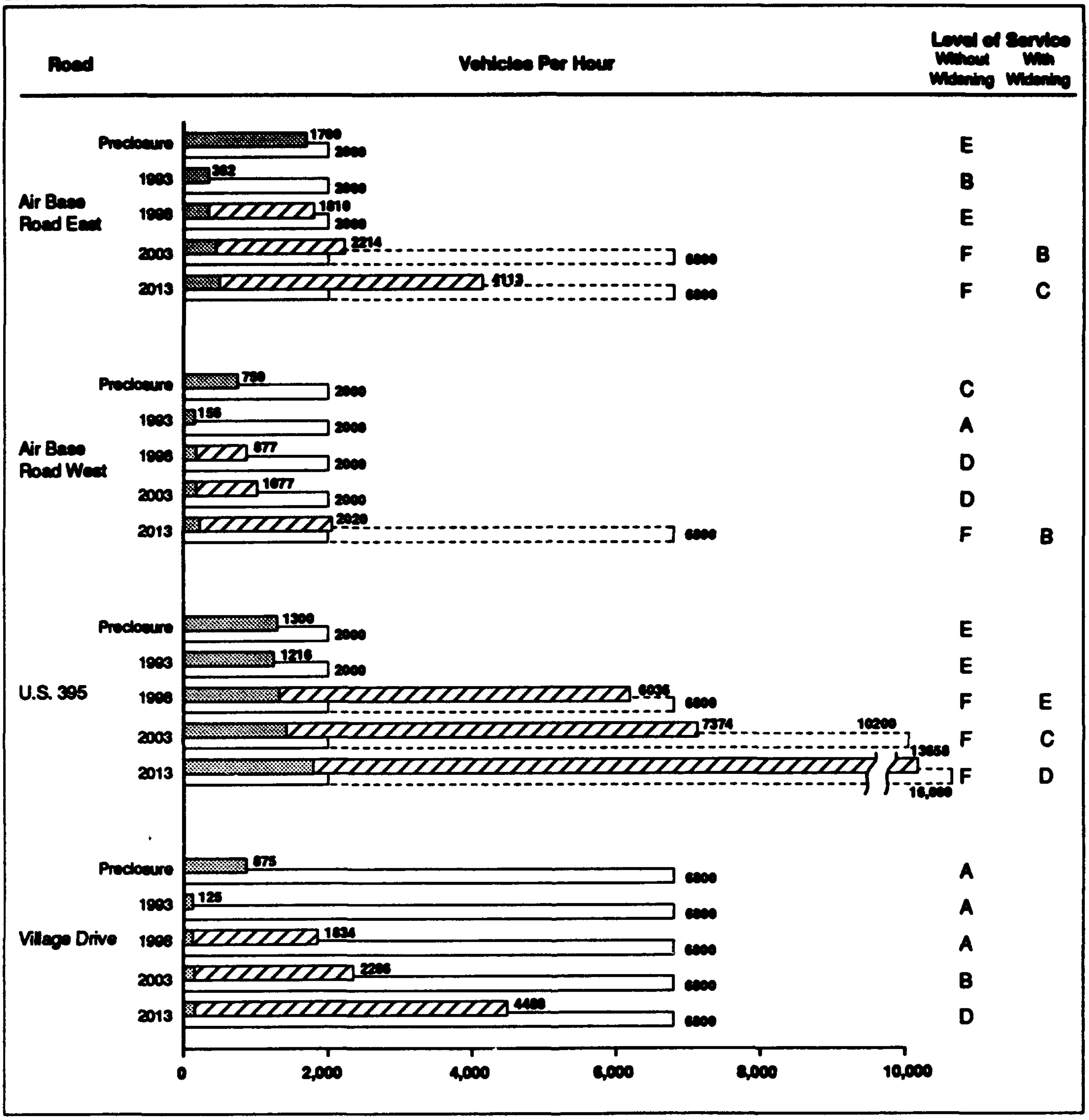
Summary of Effects on Key Community Roads. Figures 4.2-12a and b also show the projected LOS for each key community road. To avoid falling to LOS F, it would be necessary to widen Air Base Road East to 4 lanes by the year 2000, and Air Base Road West to 4 lanes by 2013. U.S. 395 would have to be widened to 4 lanes by 1995, to 6 lanes by 2002, and 8 lanes by 2009 to avoid LOS F. El Mirage Road and Desert Flower Road would have to be widened to 4 lanes by the year 1997, and 6 lanes by 2013. No improvements would be required to maintain LOS E or better on the other key community roads.

Table 4.2-4. Projection of Annual Average Daily Traffic (AADT) on Key Community Roads Generated by the International Airport Alternative (Operations and Construction Workers)

Roadway	1993[a]	1998	2003	2013
Air Base Road East				
Operations	90	14,400	17,154	30,614
Construction	0	535	47	903
Total	90	14,935	17,201	31,517
Air Base Road West				
Operations	50	7,200	8,577	15,307
Construction	0	233	21	393
Total	50	7,433	8,598	15,700
U.S. 395				
Operations	20	47,520	56,608	101,028
Construction	0	116	10	196
Total	20	47,636	56,618	101,224
Village Drive				
Operations	20	17,280	20,585	36,737
Construction	0	279	25	471
Total	20	17,559	20,610	37,208
El Mirage Road				
Operations	0	28,800	34,308	61,229
Construction	0	582	51	981
Total	0	29,382	34,359	62,210
Desert Flower Road				
Operations	0	28,800	34,308	61,229
Construction	0	582	51	981
Total	0	29,382	34,359	62,210
Totals				
Operations	180	144,000	171,540	306,144
Construction	0	2,327	205	3,925
Total	180	146,327	171,745	310,069

Note: (a) Disposal Management Team

All of these effects assume that no form of public transportation would be available to potential airline passengers. The city of Adelanto's HDIA plan assumes that the airport will remain relatively small until the SST becomes available to the high desert. Construction of that line would considerably reduce roadway use in the Victorville/Adelanto area. Operations of the SST are now tentatively scheduled for the year 2000. The Adelanto plan proposes three to four trains per hour in order to accommodate the needs of an International Airport. The Super Speed Train Commission originally conceived a direct non-stop train between southern California and Las Vegas, but has also



EXPLANATION

Non-Project Generated Traffic

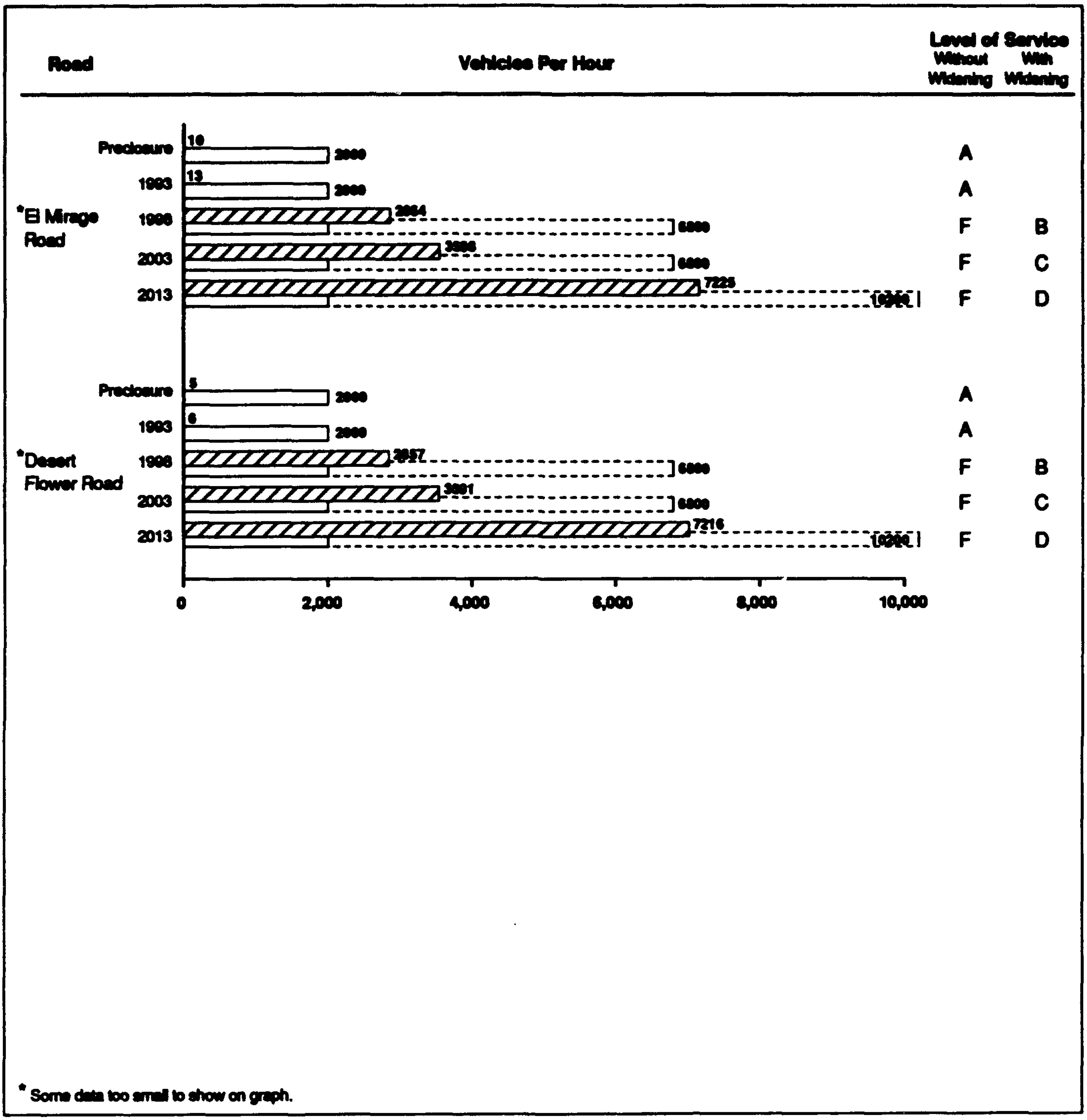
Project Generated Traffic

Capacity

Future Capacity

Peak-Hour Traffic Volumes on Key Community Roads-International Airport Alternative

Figure 4.2-12a



EXPLANATION

- Non-Project Generated Traffic
- Project Generated Traffic
- Capacity
- Future Capacity

Peak-Hour Traffic Volumes on Key Community Roads-International Airport Alternative

Figure 4.2-12b

considered minimum interim stops that would accommodate potential travelers to Las Vegas from the San Bernardino, Victor Valley, and Palmdale areas.

Assuming that four trains per hour used a terminal at a High Desert International Airport, with 1,000 passengers on each train, these 4,000 passengers would reduce the peak-hour volumes by about 2,500 vehicles. This would reduce the projected peak-hour traffic generated by this alternative by about 7 percent.

Effects on Key On-base Roads. It is assumed for the International Airport Alternative that all existing on-base roads would ultimately be replaced and that new roads would be constructed to accommodate new land uses east and west of the airport. It is not apparent from the HDIA Plan map what new roadways would be built, and therefore no analysis of those future on-base traffic conditions has been made. As International Airport plans mature and specific land uses are defined, a comprehensive on-base traffic analysis should be made to assure adequate traffic movement within the complex.

Airport Capacity. Aviation activities identified under this alternative include air passenger service, air cargo, corporate and private flying (general aviation), and aircraft maintenance. These operations could include a variety of aircraft types ranging from helicopters and small, single-engine propeller aircraft to large, cargo/passenger jets such as B-747s and DC-10s. The projected number of flight operations and the fleet mix associated with this alternative are shown in Table 4.2-5. Planned airfield expansion would include separation of the existing runways and construction of an additional new runway parallel to each of them. Based on these projections, the fleet mix and the new runway configuration, the ASV for each of the projected years would range from approximately 275,000 operations in 1998 to 355,000 operations by the year 2013. This increase is attributable to the parallel runways that would be added in later years which would increase the capacity of the four runways to accommodate more aircraft operations. The projected annual operations by 2013 exceeds the ASV capacity by 47 percent, which could result in air traffic delays and airport constraints using the proposed runway configuration.

Airspace/Air Traffic. The International Airport Alternative and this analysis assume that the same type of radar coverage would be provided for the airport, as existed prior to base closure, in order to support the high number of aircraft operations proposed under this alternative. Because this alternative includes the need for additional runways, it also identifies a requirement for added navigational aids and instrument approach procedures to these runways. However, as discussed for the Proposed Action, the retention of radar coverage and installation of navigational aid systems for reuse would depend on operational needs and availability of funds, as determined by an in-depth FAA study after the airport proponent's completion of an Airport Master Plan.

Table 4.2-5. Projected Aviation Forecast - International Airport Alternative

	Average Annual Operations			
	1993	1998	2003	2013
Aviation Category				
Air Passenger	0	80,000	200,000	525,000
Air Cargo	0	2,000	3,000	4,000
Aircraft Maintenance	0	2,000	3,000	4,000
General Aviation	0	19,400	58,400	137,300
Total Operations	0	103,400	264,400	670,300
Fleet Mix (Percent of Total Operations)				
Helicopter	0	2	2	2
Piston Engine	0	16	18	17
Turboprop	0	25	25	2
Narrow Body Jet	0	56	54	45
Wide Body Jet	0	1	1	34

Source: Based on forecasts from P&D Technologies and Caltrans.

Airspace requirements for this alternative would be initially the same as those in effect under the preclosure reference (see Figure 3.2-12) during the earlier years of the International Airport operation. This alternative identifies a requirement for a control tower which, along with navigational aids, would require that an airport traffic area, control zone, and transition area be established to provide protective airspace for airport traffic and instrument flight procedures.

As airport growth continues, the existing airspace structure, as depicted in Figures 3.2-12 and 4.2-10, may not be sufficient to accommodate the higher volume air carrier operations projected for the later years. Similar high-density operations at other major airports such as Los Angeles, Chicago, Atlanta, and New York utilize a network of standard terminal arrival routes (STARs) and SIPs to funnel air traffic into and out of the airport environment with minimal direct handling by ATC agencies. These routes procedurally separate all traffic for the active runways and normally extend beyond the immediate area of the airport. Because Runway 17 is the primary landing runway at George AFB, based on prevailing wind directions, STARs to this runway may require more airspace to the north to effectively align and sequence successive arrivals to the proposed parallel runways. This could, therefore, require additional maneuvering airspace in the southern portion of R-2515 at altitudes below 15,000 feet MSL.

Departure operations could be conducted from the Runway 21 parallels with routes separating east and west bound traffic departures so that they do not conflict with arrival routes to Runway 17. The traffic flow into and out of the airport could be affected if stronger wind conditions forced this flow to land and takeoff to the north (Runway 35) or the northeast (Runway 03). Because of the high terrain surrounding the southern and eastern areas of the base, fewer options would be available for routing traffic to/from these runways. As a result, landing/takeoff intervals would increase, causing potential airport delays and

requiring the use of "flow control" measures for other aircraft destined for the airport.

Instrument approach procedures predicated on VOR, DME, and ILS facilities would have to be designed by the FAA for radar out contingencies, as well as for possible use when arriving aircraft have to be placed into holding patterns near the airport. Such procedures may be similar to those used in preclosure conditions (see Figures 3.2-14 and 3.2-15) or could utilize a "tear drop" profile, which begins over the airport and terminates with a descending outbound and inbound track to the landing runway. The amount of protective airspace required to contain these instrument approaches could further infringe on other airspace uses in the region. The FAA would be ultimately responsible for designing these procedures and assessing potential effects on these other uses.

The number of annual operations projected by the year 2013 would be an increase of nearly 13 times the number of preclosure military operations. About 20 percent of these projected operations may be conducted under VFR by general aviation, which would place less demand on the ATC and airspace systems than did the military aircraft. However, considering the overall high number of IFR operations and the additional airspace required to support airport arrival and departure routes, this alternative has the potential to limit or delay air traffic in the region and encroach on other airspace uses. Aircraft operations during peak hour traffic periods could saturate the ATC system and therefore limit or delay arrivals and departures and constrain enroute traffic as the International Airport traffic is being funneled to and from the airway structure. Arrival and departure routes for Edwards AFB, China Lake Naval Weapons Center, Palmdale Airport, and the R-2508 complex could also be affected since they may have to be adjusted to segregate those operations from international airport traffic. It is not likely that this airport would have a direct effect on ATC airspace serving Norton AFB, March AFB, and Ontario Airport air traffic. However, an indirect impact could occur if operations from these respective locations are delayed from entering the regional enroute traffic flow as a result of air traffic generated by the international airport. VFR operations at the small public and private airports in the vicinity could continue to function without adverse effects although their ease of access may be limited by more stringent airspace controls and associated ATC communications requirements.

The potential encroachment of this Alternative on R-2515 airspace would have an impact on DOD's overall use of the R-2508 complex. Present and planned future test and training programs require full use of this complex and any loss of its airspace to accommodate the international airport's operations could jeopardize these programs.

As noted in the Proposed Action, the ATC capacity for handling instrument aircraft operations at George AFB would be greatly reduced if the existing radar surveillance system is not retained or replaced, and interfaced to an air traffic

control facility. Similarly, without the availability of navigational aids for the airport, this airfield may not be conducive for air carrier operations.

Air Transportation. The international airport would handle approximately 25 MAP by the year 2013, with expansion capabilities of up to 50 MAP. This passenger volume is nearly five times that of the 5.4 MAP handled by Ontario International Airport in 1990, and more than twice the 12 MAP volume projected at Ontario in the long term.

SCAG has forecast regional total air passenger demand at 118 MAP in the year 2010. Total air passenger volume through presently operating airports was estimated by SCAG to be constrained by airspace, ground noise, and ground access at approximately 63 MAP in the long term (SCAG, 1991).

Consequently, by the horizon year used in this study (2013), about 55 MAP (118 MAP demand less 63 MAP capacity) in air travel demand would go unmet under SCAG's forecast without new airport development. Other regional airports consequently are expected to continue operating at or above capacity if the International Airport Alternative is implemented. Air cargo shipments through the international airport would help meet the growing demand for air freight capacity projected by SCAG (1991).

Railroad Transportation. With no industrial uses proposed for the International Airport Alternative, there would be no need for the reconstruction of a rail line on the existing rail right-of-way between the base and the Union Pacific/AT&SF line about 2 miles to the east. If reconstructed, however, it could be used to bring construction materials to the base during heavy terminal and runway construction periods.

Ridership on the AMTRAK system out of Victorville is expected to increase in proportion to population increases in the Victor Valley. Under this alternative, annual ridership at the Victorville AMTRAK station would increase by about 73.7 percent from 4,600 to about 8,000 by the year 2013.

Cumulative Impacts. This alternative, coupled with other future airport growth and development planned for southern California, could place additional demands on airspace use that may not be able to be fully accommodated. The International Airport concept could be accommodated if deemed necessary by market demands, however it would likely be at the expense of other airspace uses in the area with a particular direct impact on DOD missions within the R-2508 Complex. The true extent of any impacts resulting from this alternative could not be fully defined until a formal airport proposal is submitted to the FAA and a comprehensive airspace analysis is conducted which would consider the cumulative effects of all regional airspace/airport actions. If implemented, the International Airport could be a key factor in determining how airspace in this

southern California region is aligned in the future and what effects it would be permitted to have on other airspace uses.

The SST would have the long-term effect of mitigating traffic impacts if it is implemented in conjunction with the International Airport Alternative (a projected 7 percent reduction in peak-hour traffic volume).

Mitigation Measures. *Mitigation measures for airspace impacts could not be* fully determined until completion of an FAA analysis. The findings and recommendations of such analysis, coupled with future use of technological advances such as a microwave landing system (which can allow an off-set or angled approach to a runway), may help reduce the actual impacts the International Airport could have on the airspace environment. Although planned improvements and upgrades for the ATC and navigational systems, under the National Airspace System Plan, will enhance the safety and efficiency of airspace use, they are not expected to substantially increase airport/airspace capacity. While the impacts identified in this analysis are conceptual in nature, any planned airport growth for George AFB that could affect airspace use in the R-2508 Complex should generate early interaction between the FAA, DOD, and the appropriate airport development authority to ensure the mutual beneficial use of airspace. It is the FAA's purpose to pursue the most effective means available in making airspace use as compatible as possible for all users.

4.2.3.3 Commercial Airport with Residential Alternative

Roadways. In addition to Air Base Road East, Air Base Road West, U.S. 395, and Village Drive, four other roadways are assumed to provide future access to the base area. They are Shay Road to the east, Helendale Road to the north, and El Mirage Road and Crippen Avenue to the west (see Figure 3.2-8). It is projected that only about 25 percent of the base-generated traffic under this alternative would use the latter four roads.

The roadways identified for this study as key community roads, and the percentage of base-generated traffic they are projected to carry are: Air Base Road East (33), Air Base Road West (15), U.S. 395 (8), Village Drive (19), Shay Road (10), El Mirage Road (5), Crippen Avenue (5) and Helendale Road (5). The City of Victorville General Plan Circulation Map proposes that Amethyst/Cobalt Road be improved to major arterial status with 100 feet of right-of-way (City of Victorville, 1990). This road would provide direct access to Air Base Road and the Main Gate area from the south and would take considerable pressure from Air Base Road and Village Drive.

Traffic generation for a variety of land uses has been analyzed for this alternative. The major generator would be the 8,200 dwelling units proposed on nearly 2,000 acres of base land by the year 2013. Other land uses include commercial aviation (about 1 MAP), general aviation (about 38,900 flights

Table 4.2-6. Projection of Annual Average Daily Traffic (AADT) on Key Community Roads Generated by the Commercial Airport with Residential Alternative (Operations and Construction Workers)

Roadway	1993[a]	1998	2003	2013
Air Base Road East				
Operations	90	24,803	33,525	48,387
Construction	0	140	163	0
Total	90	24,943	33,688	48,387
Air Base Road West				
Operations	50	11,274	15,239	21,994
Construction	0	64	74	0
Total	50	11,338	15,313	21,994
U.S. 395				
Operations	20	6,013	8,127	11,730
Construction	0	34	39	0
Total	20	6,047	8,166	11,730
Village Drive				
Operations	20	14,281	19,302	27,859
Construction	0	81	94	0
Total	20	14,362	19,396	27,859
Shay Road				
Operations	0	7,516	10,159	14,663
Construction	0	43	49	0
Total	0	7,559	10,208	14,663
Crippen Avenue				
Operations	0	3,758	5,080	7,331
Construction	0	21	25	0
Total	0	3,779	5,105	7,331
El Mirage Road				
Operations	0	3,758	5,080	7,331
Construction	0	21	25	0
Total	0	3,779	5,105	7,331
Helendale Road				
Operations	0	3,758	5,080	7,331
Construction	0	21	25	0
Total	0	3,779	5,105	7,331
Totals				
Operations	180	75,161	101,592	146,626
Construction	0	425	494	0
Total	180	75,586	102,086	146,626

Note: (a) Disposal Management Team

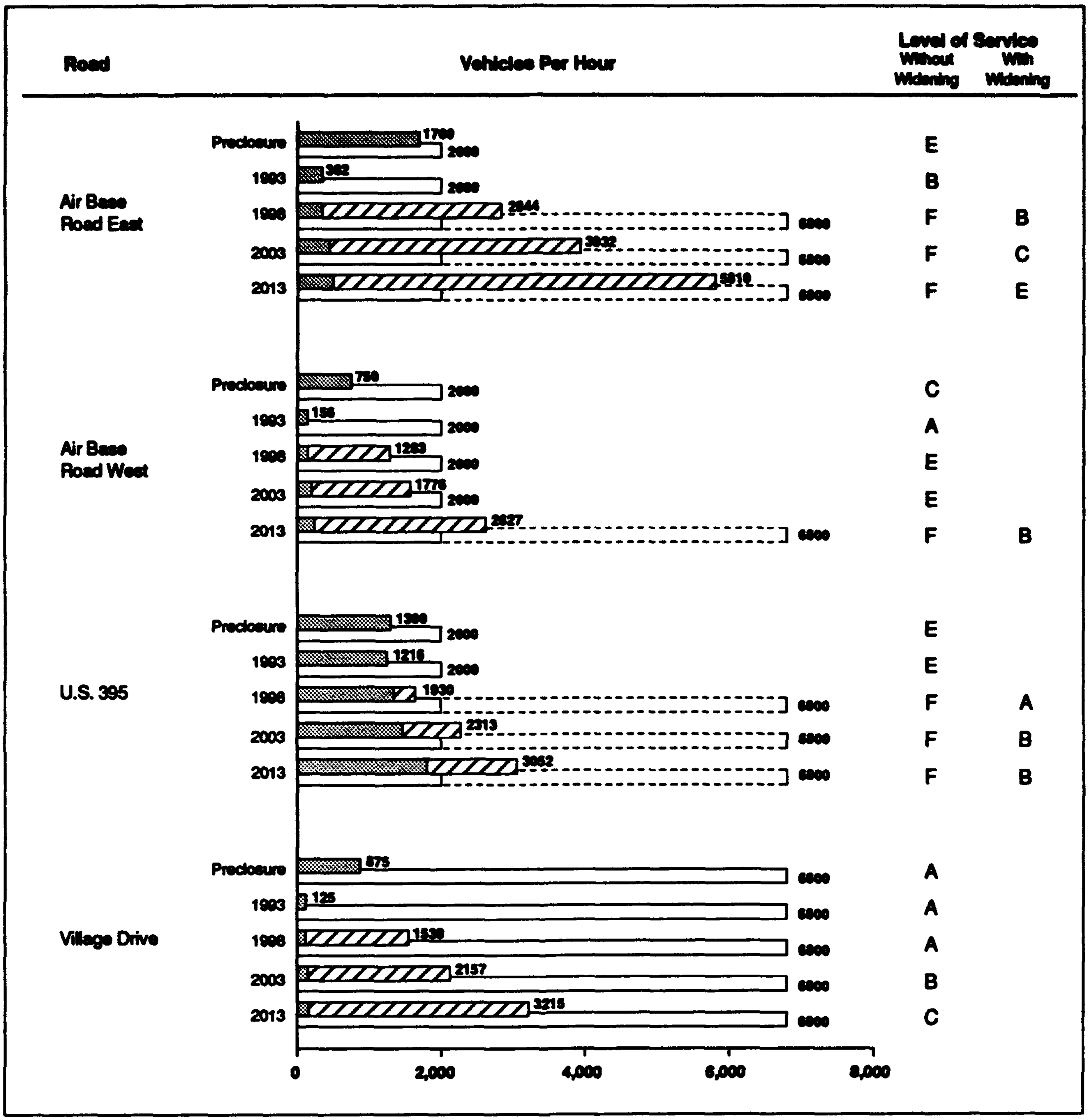
annually), aviation support (about 2,000 employees), commercial retail uses (about 280,000 square feet of floor space), college (about 700 students), high school (about 1,160 students), hospital (60 employees), and parks and vacant land (20 employees).

Effects of Project Generated Traffic on Key Community Roads. The number of daily trips generated by each type of proposed land use, in addition to construction workers, was estimated for the operations period based upon the Commercial Airport with Residential Alternative projections for number of passengers, general aviation flights, employees, students, and dwelling units, depending upon the particular land use proposed. Table 4.2-6 shows the distribution of the AADT generated by this alternative's operations and construction workers on each of the key community roads and for each of the study years through the year 2013. In the peak construction year of 2003, only about 0.5 percent of the traffic would be generated by construction traffic. In making these projections it was assumed that Air Base Road, U.S. 395, and Village Drive would be used in the same proportions that they are currently used by persons generating trips at George AFB.

The most important key community road would be Air Base Road East, which would carry about 48,400 daily trips generated by this alternative by 2013. Air Base Road West would receive about 22,000 trips, U.S. 395 about 11,700 trips, Village Drive about 27,900 trips, Shay Road about 14,700, Crippen Avenue about 7,300, El Mirage Road about 7,300, and Helendale Road about 7,300 trips that year. By the year 2013, this alternative is projected to generate a total of about 146,600 trips daily. This is about eight times the approximately 18,000 trips generated by the base in 1990 (VVEDA, 1990), and substantially higher than the estimated caretaker status of about 180 trips per day (50 DMT employees at 3.6 trips per day each).

Figures 4.2-13a and b show project- and non-project-generated peak-hour traffic for the years 1990, 1993, 1998, 2003, and 2013, for each of the key community roads. Air Base Road East and Village Drive would realize the greatest peak-hour traffic loads because they would carry project-generated traffic. Those two roadways would realize peak-hour traffic of about 5,800 and 3,200 vehicles respectively by the year 2013.

Summary of Effects on Key Community Roads. Figures 4.2-13a and b also show the projected LOS for each key community road. Air Base Road East would be most affected by this alternative. To avoid falling to LOS F, it would be necessary to widen Air Base Road East to 4 lanes by the year 1996. Air Base Road West and U.S. 395 would have to be widened to 4 lanes by the years 2006 and 1998, respectively. No improvements would be required to maintain LOS E or better on the other key community roads.



EXPLANATION

Non-Project Generated Traffic

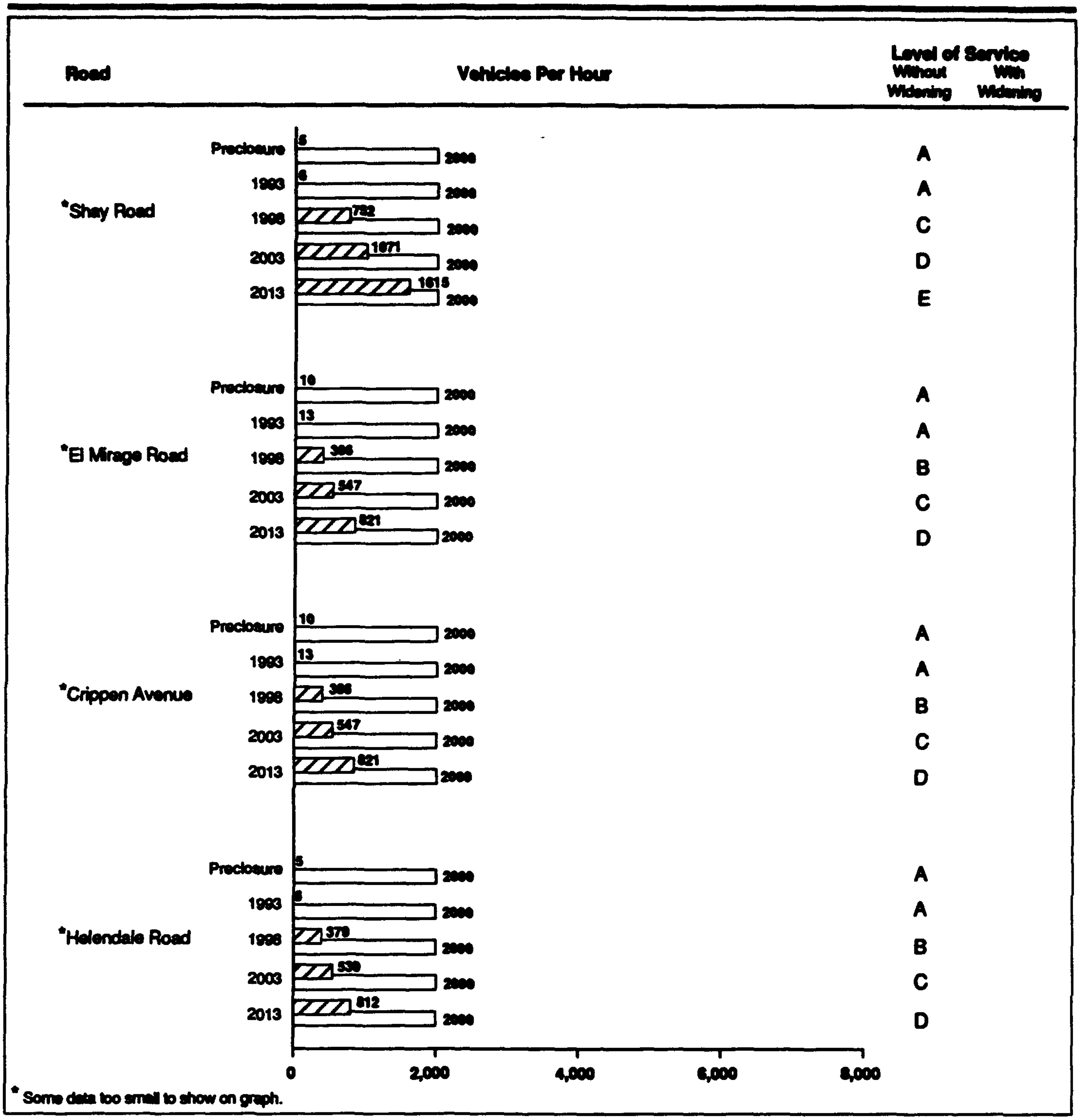
Project Generated Traffic

Capacity

Future Capacity

Peak-Hour Traffic Volumes on Key Community Roads - Commercial Airport with Residential Alternative

Figure 4.2-13a



EXPLANATION

- Non-Project Generated Traffic
- Project Generated Traffic
- Capacity
- Future Capacity

Peak-Hour Traffic Volumes on Key Community Roads - Commercial Airport with Residential Alternative

Figure 4.2-13b

Effects on Key On-base Roads. It is assumed for the Commercial Airport with Residential Alternative that most existing on-base roads will remain in place and that additional roads will be constructed to accommodate new land uses west of the airport, and south of Air Base Road. It is apparent from this alternative's land use map that the majority of the traffic generated by industrial uses would use on-base roads that are not yet built. Peak-hour traffic generated by commercial, aviation support, residential, and other minor uses would use existing on-base roads. The distribution of this traffic is projected to be similar to that at present. In 1994, the first year of operation, Cory Boulevard's peak-hour volume would reach about 1,530 under this alternative; its LOS would be an unacceptable level E. With its four-lane section, however, Phantom Street will maintain an acceptable LOS of B through the year 2013, when its peak-hour volume would reach only about 1,200.

Airport Capacity. Airport capacity for this alternative would be the same as that of the Proposed Action.

Airspace/Air Traffic. There would be no changes to the air traffic and airspace use analysis discussed for the Proposed Action.

Air Transportation. Air passenger volumes under the Commercial Airport with Residential Alternative are projected to be the same as for the Proposed Action. Air transportation impacts of this alternative consequently would be similar to those of the Proposed Action.

Railroad Transportation. With the introduction of industrial uses at George AFB, the effects on rail freight transportation in the area would be the same as those discussed for the Proposed Action.

Ridership on the AMTRAK system out of Victorville is expected to increase in proportion to population increases in the Victor Valley. Under this alternative, annual ridership at the Victorville AMTRAK station would increase by about 52.1 percent from 4,660 to about 7,000 by the year 2013.

Cumulative Impacts. Cumulative impacts under this alternative would be the same as those for the Proposed Action.

Mitigation Measures. No mitigation measures would be required for any of the transportation components.

4.2.3.4 General Aviation Center Alternative

Roadways. In addition to Air Base Road East, Air Base Road West, U.S. 395, and Village Drive, two other roadways are assumed to provide future access to the base area. They are Shay Road to the east and Crippen Avenue to the west

(see Figure 3.2-8). It is projected that only about 15 percent of the base-generated traffic under the Proposed Action would use the latter two roads.

The roadways identified for this study as key community roads and the percentage of base-generated traffic they are projected to carry are: Air Base Road East (35), Air Base Road West (20), U.S. 395 (10), Village Drive (20), Shay Road (5), and Crippen Avenue (10). The City of Victorville General Plan Circulation Map proposes that Amethyst/Cobalt Road be improved to major arterial status with 100 feet of right-of-way (City of Victorville, 1990). This road would provide direct access to Air Base Road and the Main Gate area from the south and would relieve pressure from Air Base Road and Village Drive.

Traffic generation for a variety of land uses has been analyzed for the Proposed Action. The major generator would be the 1,030,000 square feet of commercial-retail floor space projected to use about 280 acres of land on the base by the year 2013. Other land uses include aviation support (about 3,200 employees), residential (about 1,100 units), general aviation (about 50,000 flights annually), elementary school (about 1,200 students), golf course (20 employees), and parks and vacant land (200 employees).

Effects of Project Generated Traffic on Key Community Roads. The number of daily trips generated by each type of proposed land use, in addition to construction workers, was estimated based upon Proposed Action projections for number of students, general aviation flights, employees, and dwelling units, depending upon the particular land use proposed. Table 4.2-7 shows the distribution of the AADT generated by the General Aviation Center Alternative operations and construction workers on each of the key community roads for each of the study years through the year 2013. In the peak construction year of 2003, only about 0.1 percent of the traffic would be generated by construction workers. The most important key community road would be Air Base Road East, which would carry about 33,600 daily trips generated by this alternative by 2013. Air Base Road West would receive about 19,200 trips, U.S. 395 about 9,600 trips, Village Drive about 19,200 trips, Shay Road about 4,800, and Crippen Avenue about 9,600 trips that year. By the year 2013, the General Aviation Center Alternative is projected to generate about 96,100 trips daily.

This is about 5.3 times the approximately 18,000 trips generated by the base in 1990 (VVEDA, 1990), and substantially higher than the estimated caretaker status of about 180 trips per day (50 DMT employees at 3.6 trips per day each).

Figure 4.2-14a and b show project- and non-project-generated peak-hour traffic for the years 1990, 1993, 1998, 2003, and 2013 (the latter four being the project study years) for each of the key community roads. Air Base Road East would have the greatest peak-hour traffic loads. It would realize peak-hour traffic of about 3,030 vehicles by the year 2013. This is far in excess of its present

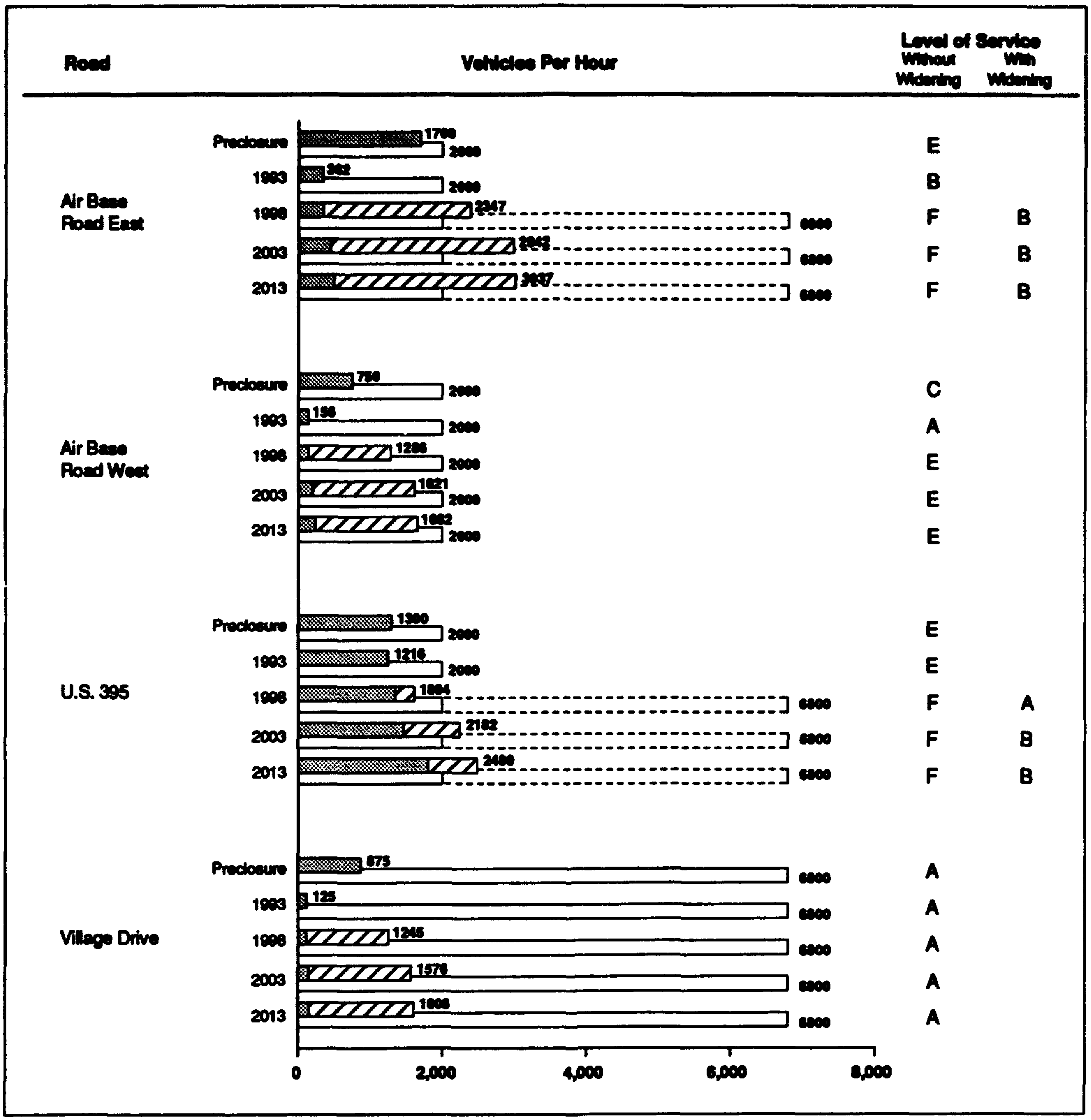
Table 4.2-7. Projection of Annual Average Daily Traffic (AADT) on Key Community Roads Generated by the General Aviation Center Alternative (Operations and Construction Workers)

Roadway	1993[a]	1998	2003	2013
Air Base Road East				
Operations	90	27,769	33,582	33,626
Construction	0	11	35	0
Total	90	27,780	33,617	33,626
Air Base Road West				
Operations	50	15,868	19,190	19,215
Construction	0	6	20	0
Total	50	15,874	19,210	19,215
U.S. 395				
Operations	20	7,934	9,595	9,607
Construction	0	3	10	0
Total	20	7,937	9,605	9,607
Village Drive				
Operations	20	15,868	19,187	19,215
Construction	0	6	20	0
Total	20	15,874	19,207	19,215
Shay Road				
Operations	0	3,967	4,797	4,804
Construction	0	2	5	0
Total	0	3,969	4,802	4,804
Crippen Avenue				
Operations	0	7,934	9,595	9,607
Construction	0	3	10	0
Total	0	7,937	9,605	9,607
Totals				
Operations	180	79,340	95,946	96,074
Construction	0	31	100	0
Total	180	79,471	96,046	96,074

Note: (a) Disposal Management Team

capacity and improvements and widening would be required to accommodate the anticipated peak hour traffic.

Summary of Effects on Key Community Roads. Figures 4.2-14a and b also show the projected LOS for each key community road. To avoid falling to LOS F, it would be necessary to widen Air Base Road East to 4 lanes by the year 1996, and U.S. 395 would have to be widened to 4 lanes by the year 1997. No



EXPLANATION

Non-Project Generated Traffic

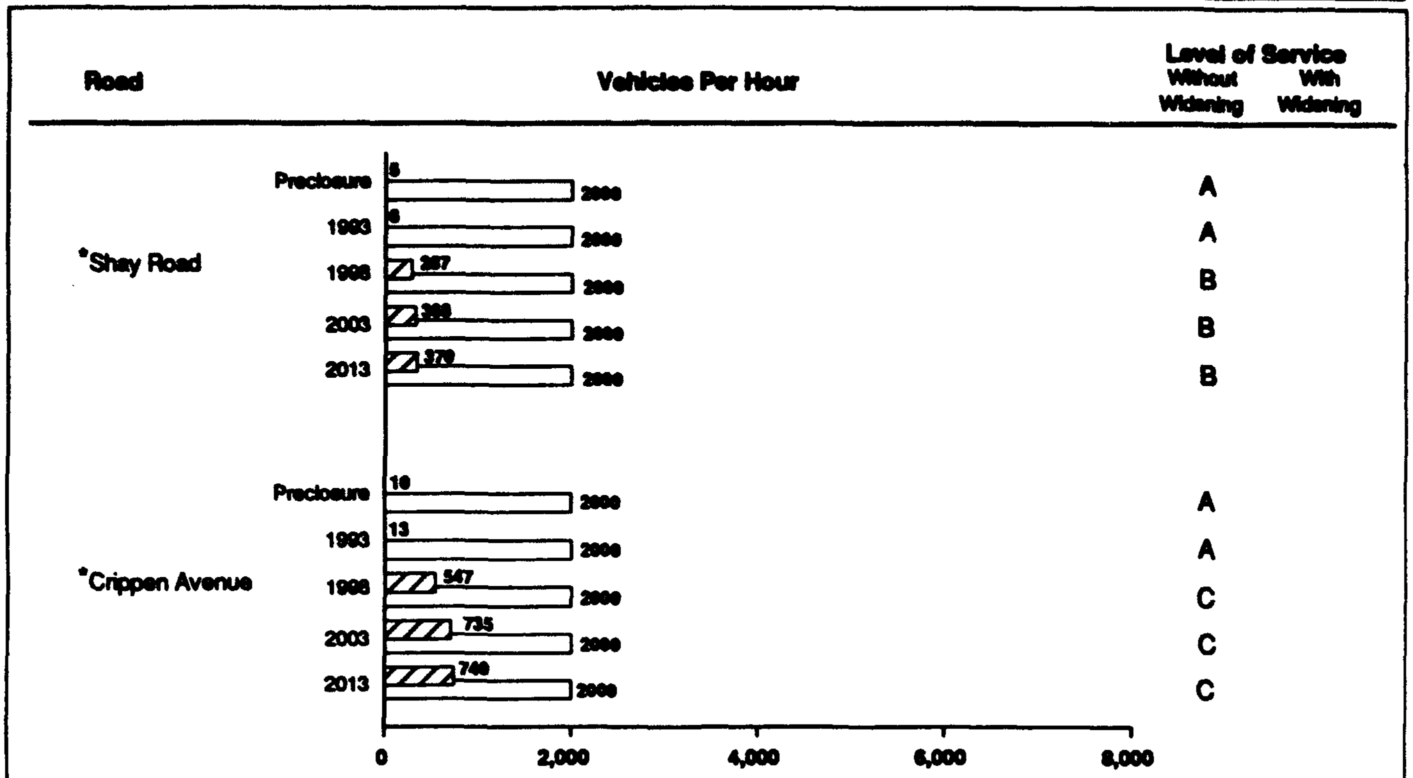
Project Generated Traffic

Capacity

Future Capacity

Peak-Hour Traffic Volumes on Key Community Roads-General Aviation Center Alternative

Figure 4.2-14a



* Some data too small to show on graph.

EXPLANATION

Non-Project Generated Traffic

Project Generated Traffic

Capacity

Future Capacity

Peak-Hour Traffic Volumes on Key Community Roads-General Aviation Center Alternative

Figure 4.2-14b

improvements would be required to maintain LOS E or better on the other key community roads.

Effects on Key On-base Roads. It is assumed for this alternative that existing on-base roads would remain in place and that additional roads would be constructed to accommodate new land uses west of the airport, and south of Air Base Road. It is apparent from the General Aviation Center Alternative land use map that the majority of the traffic generated by aviation support uses would use roads that are not yet built. Traffic generated by the other uses would use existing on-base roads. The distribution of this traffic is projected to be similar to that at present. In 1994, the first year of operation, Cory Boulevard's peak-hour volume would reach about 800 under this alternative; its LOS would be D. With its four-lane section, however, Phantom Street would maintain an acceptable LOS of A through the year 2013, when its peak-hour volume would reach only about 780.

Airport Capacity. Aviation activities associated with this alternative primarily focus on air show and experimental aircraft demonstrations, corporate and private aviation, and aircraft maintenance. These operations could include a variety of aircraft ranging from small single- and multi-engine propeller aircraft (general aviation) to large cargo and air passenger-type aircraft (maintenance/ overhaul). The types of general aviation aircraft may also include various vintage and experimental airplanes that would be a part of the air show and demonstration activities. The projected number of flight operations and the fleet mix associated with this alternative are shown in Table 4.2-8. Based on these projections and continued use of the existing runway configuration, the ASV through the year 2003 would be 200,000 operations. In all cases, the projected number of operations would not exceed 20 percent of the service volume.

Table 4.2-8. Projected Aviation Forecast - General Aviation Center Alternative

	Average Annual Operations			
	1993	1998	2003	2013
Aviation Category				
Aircraft Maintenance	500	1,600	2,600	4,000
General Aviation	12,000	27,000	35,000	50,000
Total Operations	12,500	28,600	37,600	54,000
Fleet Mix (Percent of Total Operations)				
Piston Engine	80	80	80	80
Turboprop	8	8	8	8
Narrow Body Jet	10	10	10	10
Wide Body Jet	2	2	2	2

Source: Derived from P&D Technologies Forecasts and Cline, 1990.

Airspace/Air Traffic. The type and level of aircraft operations identified for the General Aviation Center are normally conducted under visual flight rules and would not necessarily require radar, control tower, and navigational aid services. A contractor-operated control tower may be assumed, however, to monitor air show activities and maintain separation standards between non-participating airport traffic. The need for navigational aid and instrument approach procedures would be contingent on future activities and the requirement for such capability, as determined by the airport sponsor and validated by the FAA.

Airspace requirements under this alternative may be less than those in effect under the preclosure baseline. An airport traffic area would only be established to protect airport operations if a control tower is implemented. A control zone and transition area need be established only if instrument approach procedures were developed for the airport. Most air show operations and demonstrations would normally be conducted within the local airport environment. Most other general-aviation traffic would transit directly to and from the airfield in visual flight conditions. Some corporate aircraft and the larger types shuttled to the base for maintenance may utilize ATC radar services; however, they would likely not exceed 10 to 15 operations a day and would not pose any constraints on other airspace uses in the ROI.

The number of annual operations projected by the year 2013 is nearly the same as those that occurred during preclosure military operations. However, considering the type of aircraft involved with this alternative and their predominant use of visual flight procedures, there would be much less demand on the ATC and airspace systems. Based on the assumptions previously discussed and information presently available, it does not appear that the General Aviation Center would cause any impacts that would limit or delay other air traffic in the area or encroach on other airspace uses.

Air Transportation. Implementation of the General Aviation Center Alternative would provide no commercial air passenger or air cargo service to meet projected regional demands. The existing private airports in the Victor Valley may not suffer a loss of patronage with the introduction of general aviation at the George AFB airport because, unless accommodations are closer or better or fees are lower, private aircraft owners would have little reason to leave the airport they are now using. As new private aircraft are introduced to the Victor Valley, their owners might be more inclined to use the new facilities at the George AFB airport. This alternative assumes that there would be about 140 flights (departures) per day by 2013. Based on standard ratios, there would be about 300 aircraft based there.

Railroad Transportation. Without the introduction of industrial uses at George AFB, the existing rail spur right-of-way extending east from the base about 2 miles to the Union Pacific/AT&SF line would not be expected to be reconstructed.

Ridership on the AMTRAK system out of Victorville is expected to increase in proportion to population increases in the Victor Valley. Under these circumstances, with the General Aviation Center Alternative, annual ridership at the Victorville AMTRAK station would increase by about 5.7 percent from 4,600 to about 4,860 by the year 2013.

Cumulative Impacts. Cumulative impacts under this alternative would be the same as those for the Proposed Action.

Mitigation Measures. No mitigation measures would be required for any of the transportation components.

4.2.3.5 Non-Aviation Alternative

Roadways. In addition to Air Base Road East, Air Base Road West, U.S. 395, and Village Drive, four other roadways are assumed to provide future access to the base area. They are Shay Road to the east, Helendale Road to the north, and El Mirage and Crippen roads to the west. It is anticipated that about 57 percent of the base-generated traffic under the Non-Aviation Alternative would use Air Base and Crippen roads (see Figure 3.2-8).

The roadways identified for this study as key community roads, and the percentage of project-generated traffic they are projected to carry, are: Air Base Road East (28), Air Base Road West (13), U.S. 395 (7), Village Drive (16), Shay Road (5), Crippen Avenue (16), El Mirage (10), and Helendale roads (5). The City of Victorville General Plan Circulation Map proposes that Amethyst/Cobalt Road be improved to major arterial status with 100 feet of right-of-way (City of Victorville, 1990). This road would provide direct access to Air Base Road and the Main Gate area from the south and would take considerable pressure off Air Base Road and Village Drive.

Traffic generation for a variety of land uses has been analyzed for the Non-Aviation Alternative. The major generator would be the proposed 13,150 residential units developed in the project by the year 2013. Other land uses include commercial retail uses (218,000 square feet of floor space), business park (4,680 employees), high school students (about 1,160), college students (about 8,400), hospital (60 employees), golf course (20 employees), parks and open space (about 30 employees).

Effects of Project Generated Traffic on Key Community Roads. The number of daily trips generated by each type of proposed land use, in addition to construction workers, was estimated for the operations period based upon Non-Aviation Alternative projections for number of employees, students, square feet of retail area, and dwelling units, depending upon the particular land use proposed. Table 4.2-9 shows the distribution of the AADT generated by the Non-Aviation Alternative operations and construction workers on each of the

Table 4.2-9. Projection of Annual Average Daily Traffic (AADT) on Key Community Roads Generated by the Non-Aviation Alternative (Operations and Construction Workers)

Roadway	1993[a]	1998	2003	2013
Air Base Road East				
Operations	90	17,001	29,853	51,761
Construction	0	90	90	186
Total	90	17,091	29,943	51,947
Air Base Road West				
Operations	50	7,893	13,860	24,032
Construction	0	42	42	87
Total	50	7,935	13,902	24,119
U.S. 395				
Operations	20	4,250	7,463	12,940
Construction	0	22	22	47
Total	20	4,277	7,485	12,987
Village Drive				
Operations	20	9,715	17,059	29,578
Construction	0	51	51	107
Total	20	9,766	17,110	29,685
Shay Road				
Operations	0	3,036	5,331	9,243
Construction	0	16	16	33
Total	0	3,052	5,347	9,276
El Mirage				
Operations	0	6,072	10,662	18,486
Construction	0	32	32	67
Total	0	6,104	10,694	18,553
Crippen Avenue				
Operations	0	9,715	13,024	29,834
Construction	0	83	83	107
Total	0	9,798	13,107	29,941
Helendale				
Operations	0	3,036	4,070	9,243
Construction	0	16	16	33
Total	0	3,052	4,086	9,276
Totals				
Operations	180	60,718	101,322	185,117
Construction	0	352	352	667
Total	180	61,070	101,674	185,784

Note: (a) Disposal Management Team

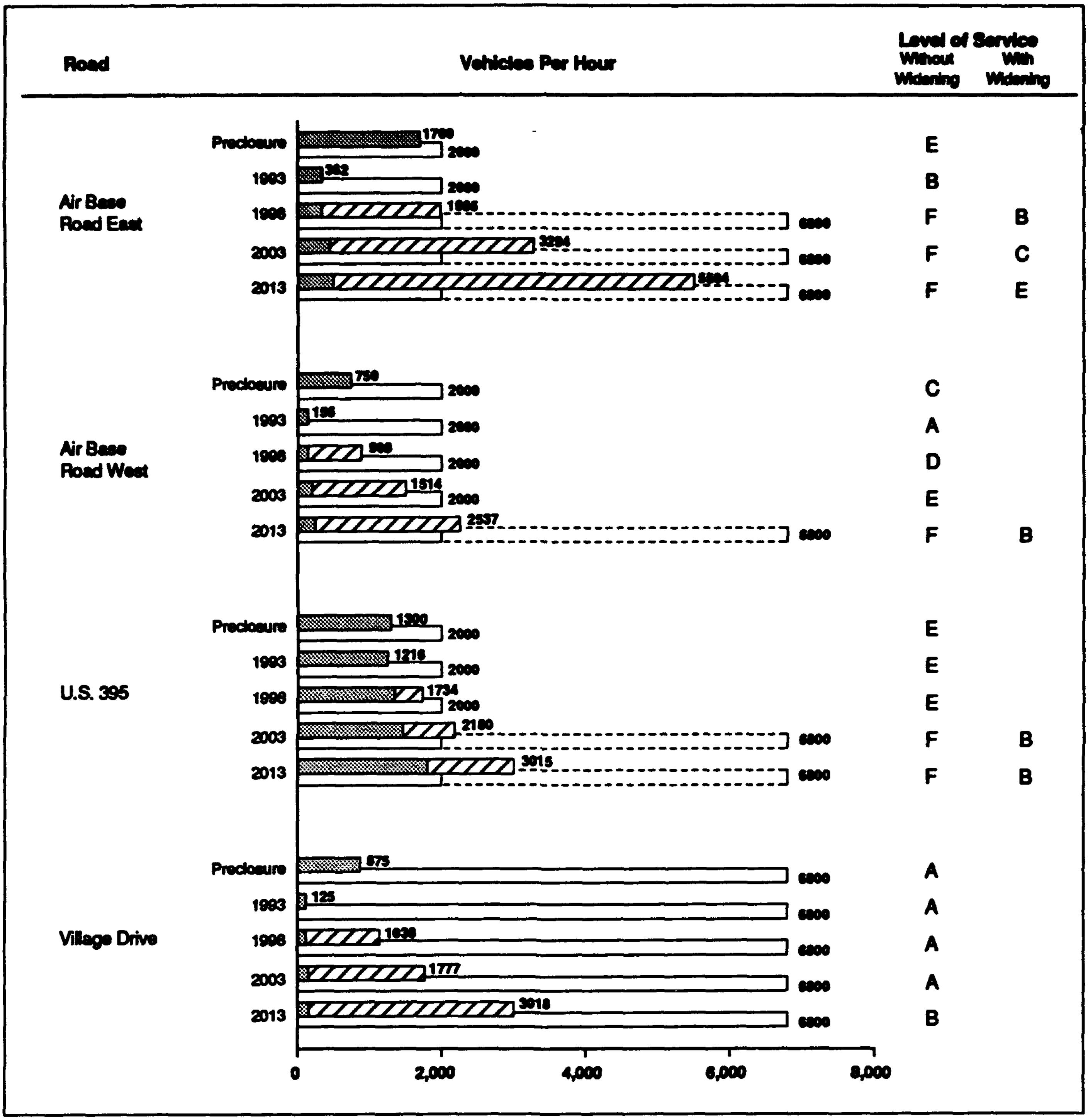
key community roads for each of the study years through the year 2013. In the peak construction year, 2013, only about 0.3 percent of the traffic would be generated by construction workers. In making these projections it was assumed that Air Base Road, U.S. 395, and Village Drive would be used in the same proportions that they are currently used by persons generating trips at George AFB. Assumptions made for the percentage of project-generated traffic that would use each of the defined key community roads are noted above.

The most important key community road would be Air Base Road East, which would carry about 51,900 daily trips generated by the Non-Aviation Alternative by 2013. Air Base Road West would receive about 24,100 trips, U.S. 395 about 13,000 trips, Village Drive about 29,700 trips, Shay Road about 9,300 trips, El Mirage Road about 18,600, Crippen Avenue about 29,900 trips, and Helendale Road about 9,300 trips that year. By the year 2013, this alternative is projected to generate about 185,800 trips daily. This is about ten times the approximately 18,000 trips generated by the base in 1990 (VVEDA, 1990), and substantially higher than the estimated caretaker status of about 180 trips per day (50 caretaker employees at 3.6 trips per day each).

Figures 4.2-15a and b show Non-Aviation Alternative project- and non-project-generated peak-hour traffic for the years 1990, 1993, 1998, 2003, and 2013, for each of the key community roads. Air Base Road East would realize the greatest peak-hour traffic loads because it would carry project-generated traffic of about 5,500 vehicles in 2013. Village Drive and Crippen Road would each realize peak-hour traffic of about 3,000 and 2,900 vehicles respectively, by the year 2013.

Summary of Effects on Key Community Roads. Figures 4.2-15a and b also show the projected peak-hour volume and LOS for each key community road. To avoid falling to LOS F, it would be necessary to widen Air Base Road East to four lanes by the year 1998, Air Base Road West by 2007, U.S. 395 by 1999, and Crippen Road by the year 2005. No improvements would be required to maintain LOS E or better on the other key community roads.

Effects on Key On-base Roads. It is assumed for the Non-Aviation Alternative that existing on-base roads would remain in place and that additional roads would be constructed to accommodate new land uses on the western part of the base, and south of Air Base Road. It is apparent from the Non-Aviation Alternative land use map that the majority of the traffic generated by uses in these areas would use roads that are not yet built. Peak-hour traffic generated by industrial, commercial, business park, some residential, and other minor uses would use existing on-base roads. The distribution of this traffic is projected to be similar to that at present. In 1994, the first year of operation, Cory Boulevard's peak-hour volume will reach 900 under the Non-Aviation Alternative; its LOS would be level D. With its four-lane section, however,



EXPLANATION

Non-Project Generated Traffic

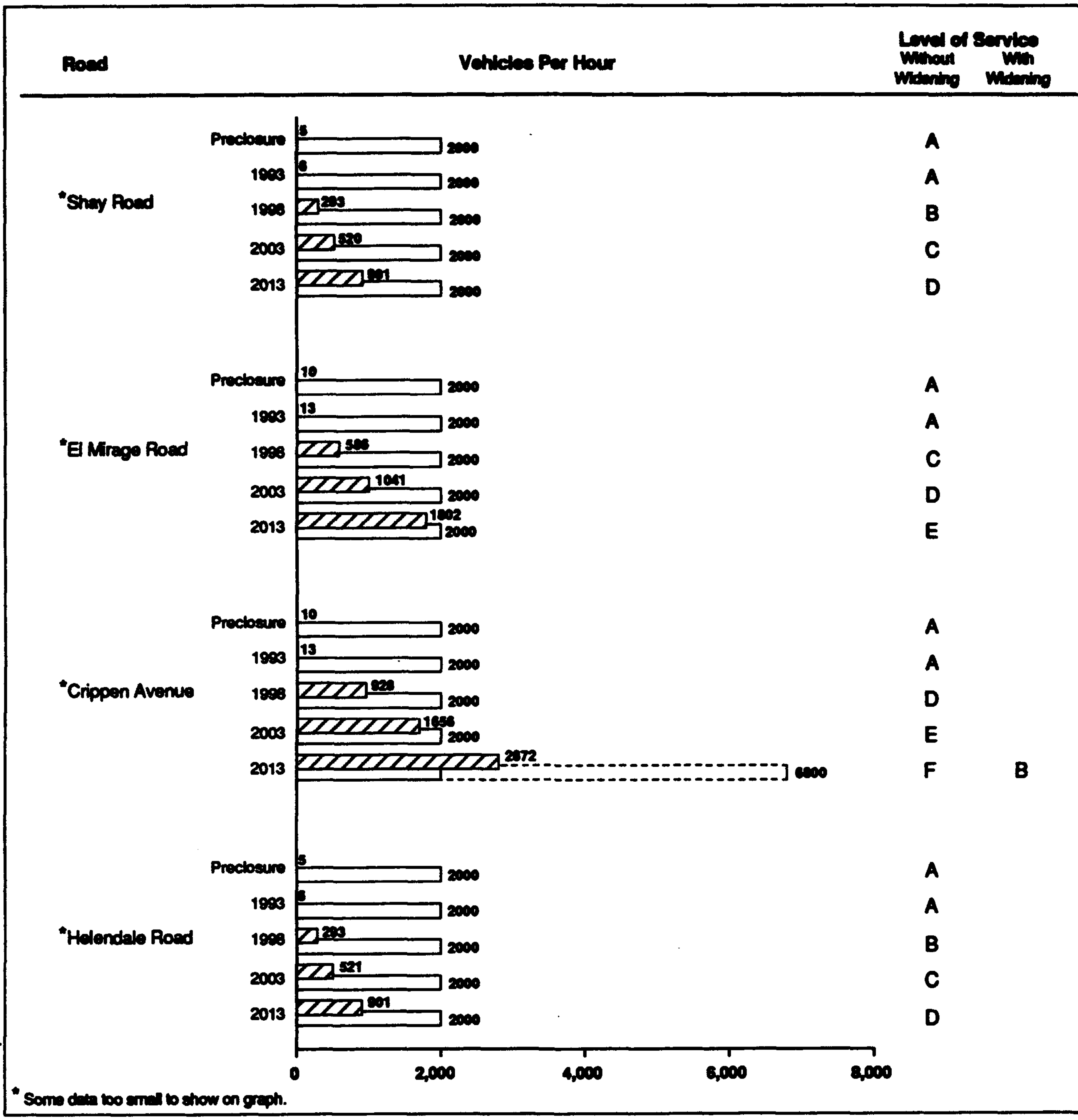
Project Generated Traffic

Capacity

Future Capacity

Peak-Hour Traffic Volumes on Key Community Roads-Non-Aviation Alternative

Figure 4.2-15a



EXPLANATION

Non-Project Generated Traffic

Project Generated Traffic

Capacity

Future Capacity

Peak-Hour Traffic Volumes on Key Community Roads-Non-Aviation Alternative

Figure 4.2-15b

Phantom Street would maintain an acceptable LOS of A through the year 2013 when its peak-hour volume would reach only about 800.

Airspace/Air Traffic. The use of George AFB for non-aviation purposes could have a beneficial effect on air traffic and airspace in the ROI by eliminating a contributing source of aviation activities in the area. Airspace actions associated with this alternative would be as specifically addressed in the No-Action Alternative (Section 4.2.3.7).

Air Transportation. Implementation of the Non-Aviation Alternative would provide no commercial air passenger or air cargo service to meet projected regional demands.

Railroad Transportation. With the introduction c strial uses at George AFB, the existing rail spur right-of-way extending ea. rom the base about 2 miles to the Union Pacific/AT&SF line could be expected to be reconstructed to accommodate freight traffic. Depending upon the type of industrial uses developed at the base, the rail spur could be expected to serve one to five trains per week. The freight that could be developed by the Non-Aviation Alternative would be very small compared to the total amount that presently uses the Union Pacific/AT&SF line in that area.

Ridership on the AMTRAK system out of Victorville is expected to increase in proportion to population increases in the Victor Valley. Under this alternative annual ridership at the Victorville AMTRAK station would increase by about 51.3 percent from the projected approximately 4,600 in 1991 to about 6,950 by the year 2013.

Cumulative Impacts. Cumulative impacts under this alternative would be the same as those for the Proposed Action.

Mitigation Measures. No mitigation measures would be required for any of the transportation components.

4.2.3.6 Other Land Use Concepts. Transportation effects are discussed in this section for each proposed federal transfer and independent land use concept (Section 2.3.5). The analysis considers the impact of the implementation of each of these plans in conjunction with the Proposed Action or alternatives. The net change in traffic generated is presented. This analysis concentrates only on roadway transportation because these alternatives will not affect airspace, air, or rail transportation.

U.S. Department of Justice. The Federal BOP request for use of 850 acres of George AFB south of Air Base Road would employ about 1,000 persons, who would generate about 4,030 daily trips. For the Proposed Action, the AADT and

peak-hour traffic would be reduced by about 7.1 percent; for the International Airport Alternative, about 7.6 percent; for the Commercial Airport with Residential Alternative, about 17.6 percent; with the Non-Aviation Alternative, 21.3 percent; and with the General Aviation Center Alternative, AADT would be increased by about 2.7 percent.

U.S. Department of Interior. This transfer would result in the reduction of AADT and peak-hour traffic volume by about 0.2 percent for the International Airport Alternative.

U.S. Department of Housing and Urban Development. For the Proposed Action there would be a reduction of AADT and peak-hour traffic volume of about 0.7 percent; and for the International Airport Alternative, about 1.4 percent.

U.S. Department of Education. This transfer would affect traffic impacts for two alternatives. For the Proposed Action there would be a reduction of AADT and peak-hour traffic volume of about 0.8 percent; and for the International Airport Alternative, about 0.2 percent.

San Bernardino County Work Furlough Program. Employee-generated traffic changes would be similar to those under the BOP proposal. For the Proposed Action, there would be a reduction of AADT and peak-hour traffic volume of 2.2 percent; for the International Airport Alternative, there would be a reduction of 0.1 percent.

Medical Facilities. Reuse would most likely entail conversion to an out-patient clinic, special purpose, or medical teaching facility. Employee-generated traffic changes would be similar to those under the BOP proposed. For the Proposed Action, the AADT and peak-hour traffic volume would be reduced by 1.2 percent; under the International Airport Alternative, they would be reduced by 1.3 percent.

4.2.3.7 No-Action Alternative. In the absence of any reuse of the base under the No-Action Alternative, on-base roads would no longer be used except by a 50-person DMT using primarily Cory Boulevard. All on-base roads would operate at LOS A.

Traffic on key community roads would increase in proportion to the area's population without the traffic generated by any reuse of the base. U.S. 395, which is currently impacted at LOS E (1,300 vehicles) during peak hour traffic, is projected to have a peak hour volume of 1,770 vehicles by the year 2013. This will require widening of the highway to maintain design capacity standards and to avoid LOS F. All other key community roads are not projected to be impacted by traffic in the area.

Airspace/Air Traffic. As discussed for the closure baseline, airspace actions following the closure of George AFB would include revocation of the George AFB control zone, cancellation of the George AFB ATA, and the discontinuance of George AFB's GCA radar traffic area airspace. Cancellation of the George AFB control zone and ATA would not adversely affect terminal or enroute airspace management in the area. The closure of George AFB would also result in the cancellation of all the existing published instrument procedures for the airfield, which would eliminate the need for protecting the airspace associated with these procedures.

Total closure of George AFB would eliminate all aircraft operations, present or future, that would use the airspace associated with the airfield traffic pattern and the transitioning of aircraft between the airfield and the enroute airspace system. Enroute air traffic that currently transits the airspace associated with George AFB flight activity would not be affected by the airbase closure.

Closure of George AFB's GCA radar facility should not adversely affect airspace management in the George ROI. Removal of the radar would delete air traffic control radar coverage below 4,500 feet MSL in the area now served by this facility. However, there would be no significant need for terminal radar services because there are no other active civil or military airports in this area that have published instrument approach procedures. Additionally, the George GCA radar does not provide any vital ATC services to aircraft operating on any of the federal enroute airways that transit the area.

Cumulative Impacts. Cumulative impacts under this alternative would be the same as for the Proposed Action.

Mitigation Measures. No mitigation measures would be required under this alternative.

4.2.4 Utilities

Direct and indirect changes in future utility demand for each alternative were estimated based on historic, preclosure, and per-capita average daily use on George AFB and in the Victor Valley. These factors were applied to projections of numbers of future residents and employees associated with each of the alternatives.

For each utility, the changes in land use associated with the Proposed Action and alternatives would likely create the need for changes in the existing distribution and collection systems at George AFB, including modifications to on-base water pumping and treatment facilities, wastewater collection systems, service providers for solid waste disposal, and distribution systems for electricity and natural gas. Utility corridors would likely be required and new service entrances with metering may be needed on existing facilities. The full extent of

these changes, however, cannot presently be anticipated because only conceptual plans of future development currently exist for the site.

For each of the reuse alternatives analyzed in this section, the following assumptions were made:

- The future site developers would undertake any corrective actions necessary to comply with VVWRA ordinances including modifications to the existing on-base wastewater collection system and construction of pre-treatment facilities if necessary, and wastewater flows from the site would remain connected to the VVWRA interceptor system and treatment facilities.
- The site of George AFB would be serviced by local utility purveyors.
- The specific infrastructural improvements required and the associated costs of such improvements would be borne directly or indirectly by the future site developer(s).
- On site demand impacts are expected to be small relative to the utility provider's service area demand projections. Consequently, project-related usage was included in the total demand and not further differentiated by location.

Prior to the announcement of the closure of George AFB, the base was planning to make infrastructural changes to the water supply system to generally upgrade the existing system and accommodate additional demand predicted through 2010. A 1984 report identified the long-term on-base requirement for an additional 2.5 MGD in average daily demand by the year 2010. It also recognized the need for the base to establish water rights of the existing Mojave River wells. The report indicated that in 1960 the base and the city of Adelanto were jointly issued water rights from the California Department of Water Resources to pump up to 3.34 cfs from the existing river wells, although both historic usage and productive capacity of the wells was and remains in excess of the water rights granted (Lee and Ro, 1984).

This report discussed four potential alternative plans for providing additional water to the base. The plans were as follows:

- Develop 14 on-base wells to replace existing river wells.
- Develop 7 on-base wells to augment existing river wells and purchase 4 of the 7 river wells from the city of Adelanto.
- Develop 7 on-base wells and purchase land and develop additional river wells near the existing wells.
- Develop 7 on-base wells and construct a 10.5-mile pipeline, treatment plant, and associated facilities to provide a 7-MGD connection with the California Aqueduct.

The MWA and the numerous individual water purveyors that serve the communities in the Victor Valley are presently planning both short- and long-term infrastructure improvements on a relatively large-scale basis in anticipation of substantial rates of population growth. In the MWA Master Plan,

three options for the delivery of up to 87 MGD of water from the State Water Project via the California Aqueduct were analyzed. The capital costs ranged from $251.4 million to $267.4 million and operating costs were estimated at about $37.2 million annually for each option to accommodate expected growth through 2010 (1990 dollars).

4.2.4.1 Proposed Action. Table 4.2-10 presents a summary of utility demand changes associated with the Proposed Action.

Table 4.2-10. Utility Demand Changes in the Victor Valley - Proposed Action

	1993	1998	2003	2013
Water Demand				
Upper Basin Region (in MGD)				
Post-closure	40.4	49.7	59.0	77.5
Proposed Action	40.4	51.5	62.8	83.6
Change from Post-closure	0.0	1.8	3.8	6.1
Percent Change	0.0	3.7	6.5	7.9
Wastewater Generation				
VVWRA Service Area (in MGD)				
Post-closure	6.7	10.4	15.5	22.5
Proposed Action	6.7	10.8	16.6	24.3
Change from Post-closure	0.0	0.4	1.1	1.8
Percent Change	0.0	4.0	6.8	8.0
Solid Waste Generation				
Victor Valley Landfills (in millions of cubic yards per year)				
Post-closure	0.8	1.01	1.22	1.64
Proposed Action	0.8	1.05	1.30	1.77
Change from Post-closure	0.0	0.04	0.08	0.13
Percent Change	0.0	1.5	3.2	5.3
Electricity Demand				
SCE Victorville District (in MWH/day)				
Post-closure	4,801	6,192	7,592	10,275
Proposed Action	4,801	6,363	7,955	10,855
Change from Post-closure	0	171	363	580
Percent Change	0.0	2.8	4.8	5.6
Natural Gas Demand				
SWG Victorville District (in therms/day)				
Post-closure	305,680	446,616	588,698	875,154
Proposed Action	305,680	455,875	608,035	905,643
Change from Post-closure	0	9,259	19,337	30,489
Percent Change	0.0	2.1	3.3	3.5

Sources: Based on Mojave Water Agency, 1990; Victor Valley Wastewater Reclamation Authority, 1988; San Bernardino County Solid Waste Management Department, 1989, 1991; California Energy Commission, 1990; Southern California Edison Company, 1991; Southwest Gas Company, 1991.

Water Supply. Under the Proposed Action, water demand within the Upper Basin region of the MWA service area, which encompasses the Victor Valley, would increase over the demand estimated for the closure baseline (Figure 4.2-16). In the short term, through about 1995, the overall project-related increase in the water demand would remain below an average of about 1 MGD. By 2013, the average project-related demand would be 6.1 MGD.

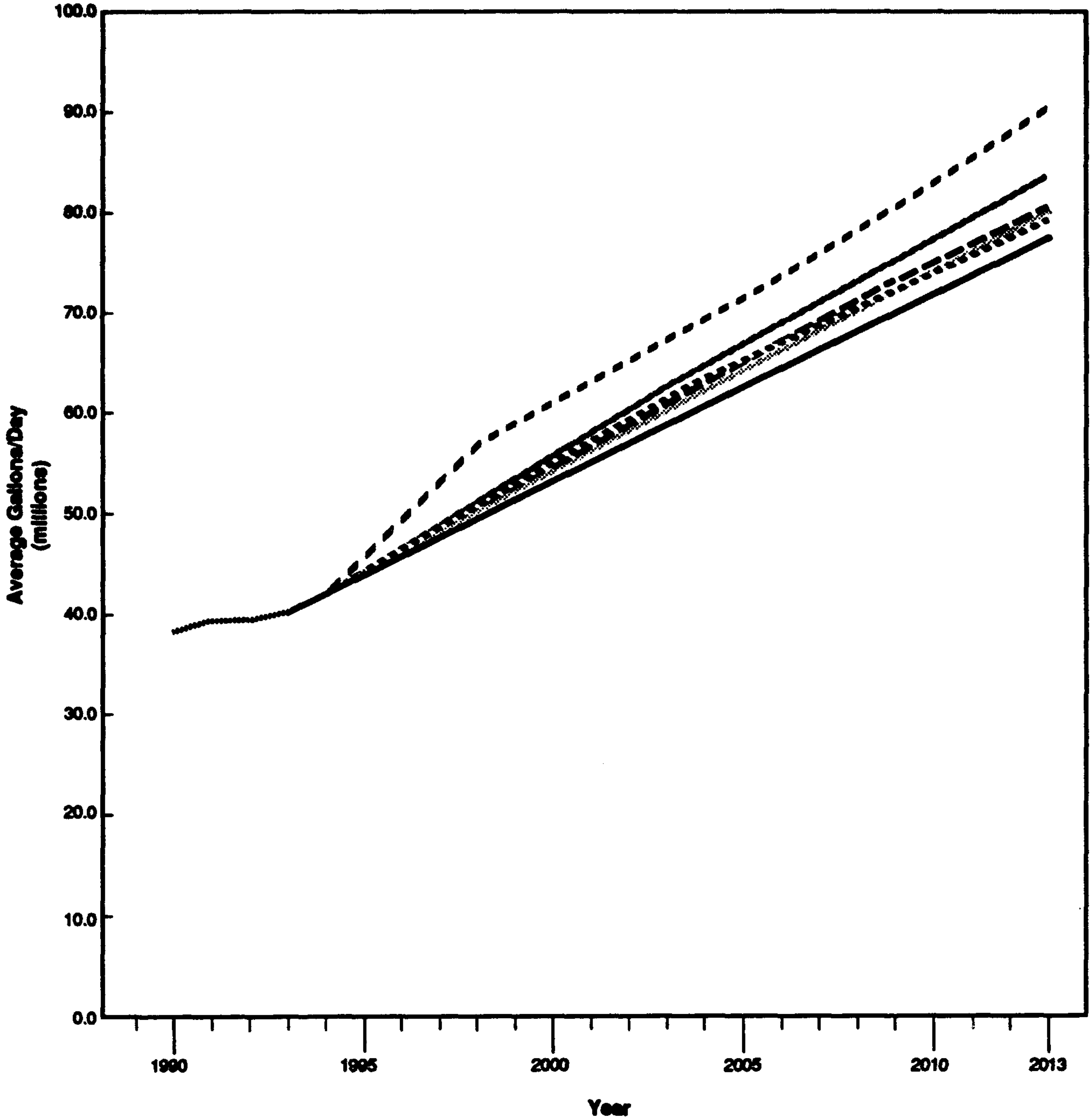
Infrastructural changes would be required throughout the Victor Valley in the various districts that would experience direct and indirect population changes from the Proposed Action. Under the Proposed Action, total demand within the region would reach an average of 83.6 MGD by 2013, approximately 4 percent greater than the extrapolated MWA projection (80.7 MGD) for that year.

Current extraction rates from the river wells that supply the base are in excess of levels granted by the California Department of Water Resources. If water consumption levels increase substantially from reuse, and/or adjudication of water rights in the Victor Valley limits the ability to pump from the existing river wells, future site developers will have to identify other options for the provision of additional water.

Specific alterations to the water supply system would be dependent on the developers requirements and the purveyors' plans to change the existing on-base supply infrastructure. Formal procedures, consisting of submission of a tariff map to the California Public Utilities Commission, as well as public review and hearings, would be required prior to annexation of the base to the service area by any water purveyor.

The increased population and resulting increase in water demand from the Proposed Action would require the MWA and individual water districts in the Victor Valley to make presently planned long-term infrastructural improvements 1 to 2 years ahead of the schedule indicated by the MWA Projection. The overall changes to their short- and long-term plans, however, would not be substantially different from their current needs assessments which indicates the need for major changes throughout the next two decades. Water supply issues are analyzed in Section 4.4.2, Water Resources.

Wastewater. Wastewater treatment within the service area of the VVWRA, which encompasses the Victor Valley, would increase as a result of the Proposed Action over estimated treatment levels projected for the closure baseline (Figure 4.2-17). In the short term, through about 1995, the overall increase in the wastewater treatment demand would remain below an average of about 0.2 MGD. By 2013, the overall increase from the Proposed Action would be an average of 1.8 MGD.



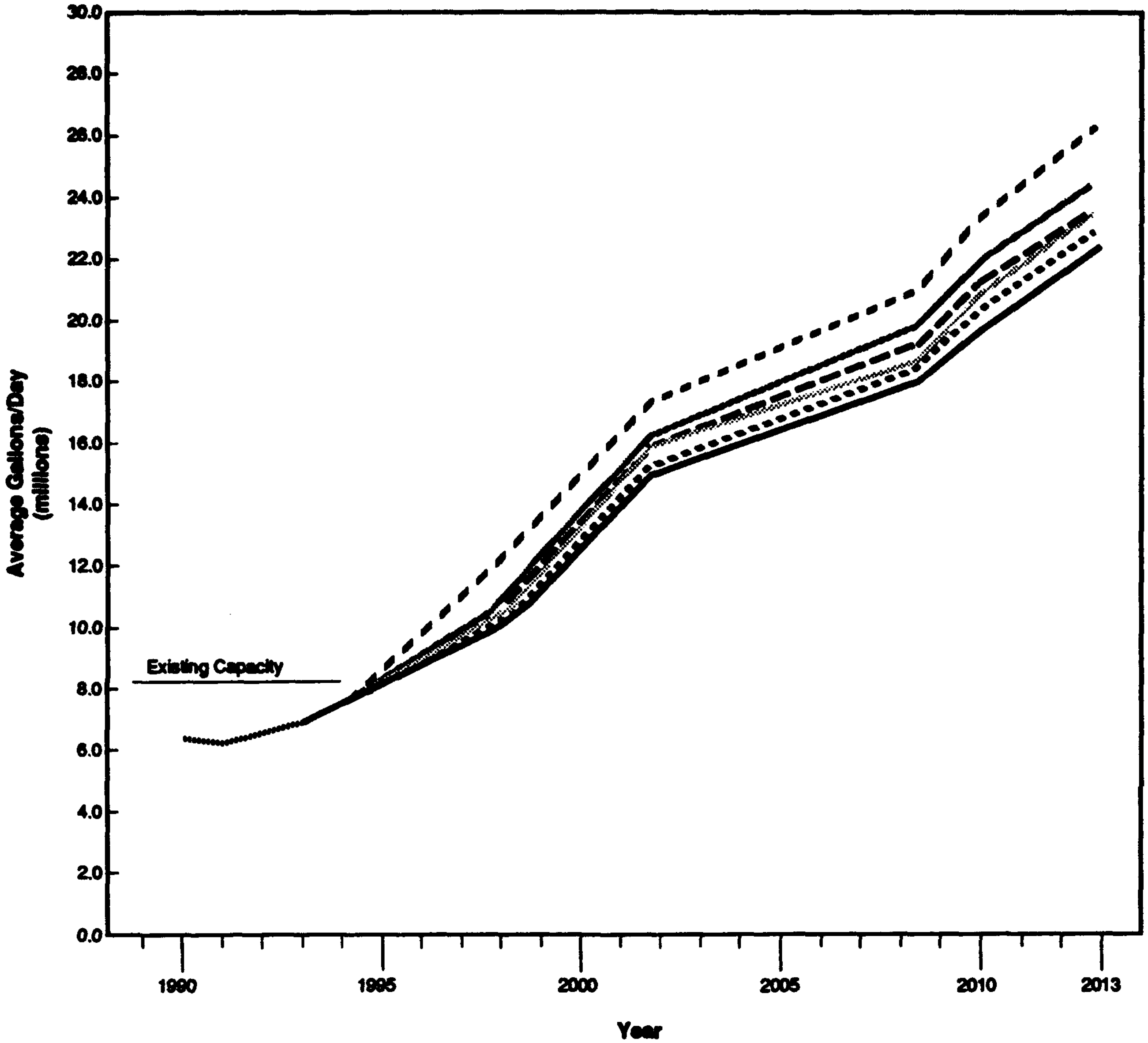
Source: Mojave Water Agency, 1990.

EXPLANATION

- No Action
- Proposed Action
- International Airport
- Non-Aviation
- Commercial Airport
- General Aviation Center
- Preclosure

Average Daily Water Demand - All Alternatives (1990-2013)

Figure 4.2-16



Source: Based on VVWRA, 1988.

EXPLANATION

- No Action
- Proposed Action
- International Airport
- Non-Aviation
- Commercial Airport
- General Aviation Center
- Preclosure

Average Daily Wastewater Generation-All Alternatives (1990-2013)

Figure 4.2-17

Additional infrastructural changes would be required throughout the Victor Valley within the various wastewater collection districts that would experience direct and indirect populations changes from the Proposed Action. Total demand within the VVWRA service area would reach an average of 24.3 MGD by 2013, approximately 4 percent greater than the VVWRA implicit projection for that year.

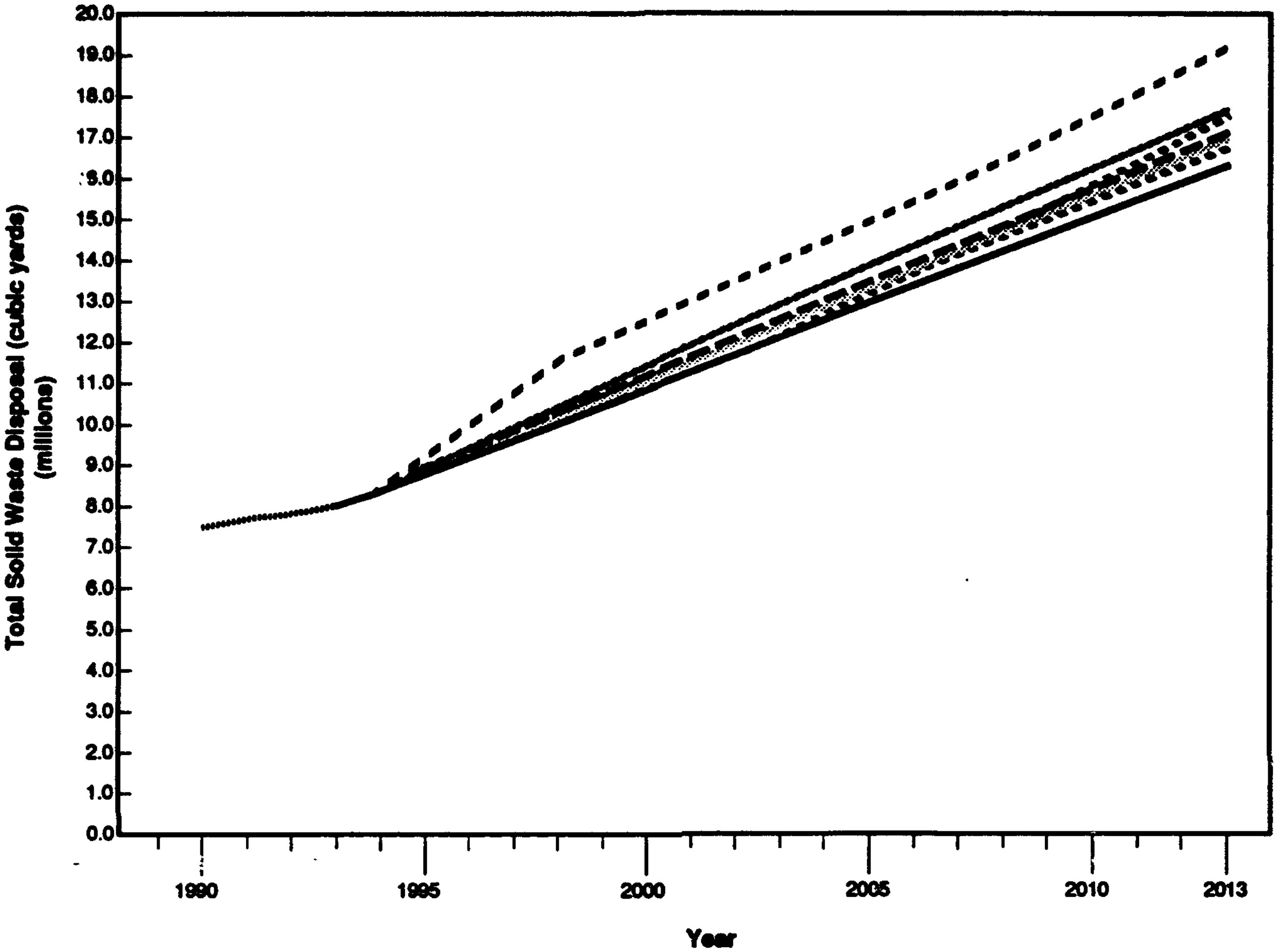
The increased population and resulting increase in wastewater treatment demand from the Proposed Action would require VVWRA and individual wastewater collection agencies in the Victor Valley to make presently-planned long-term infrastructural improvements about 1 year ahead of the schedule indicated by the *Wastewater Master Plan*. The overall changes to their short- and long-term plans would not be substantially different from their current needs assessment, which indicates the need for major changes throughout the next two decades. Groundwater quality and related issues are analyzed in Section 4.3, Hazardous Materials/Hazardous Waste and Section 4.4.2, Water Resources.

Solid Waste. Solid waste disposal at the Apple Valley, Hesperia, Phelan, and Victorville landfills would increase from the closure baseline as a result of the Proposed Action (Figure 4.2-18). Under the Proposed Action, the existing capacities of the four landfills would be reached by 1992 for the Apple Valley and Victorville landfills, 1996 for Hesperia, and 2006 for Phelan. The additional expansion potential at the Apple Valley and Victorville landfills would be reached by 2004 under the Proposed Action. Although the expansion potential for the Hesperia landfill has not yet been determined, the county is presently seeking to expand its existing capacity (San Bernardino County SWMD, 1991).

The increased population and resulting increase in solid waste disposal from the Proposed Action would require additional landfill capacity in the Victor Valley less than 1 year ahead of the schedule indicated by per-capita solid waste disposal rates and future population growth. Source reduction and recycling programs that are presently receiving greater legal and budgetary emphasis could extend the cumulative landfill expectancies in the Victor Valley by as many as 5 to 10 years, depending on the actual effectiveness of such programs. Changes to the county's short- and long-term plans for landfill capacity expansion in the Victor Valley would not be substantially altered under the Proposed Action.

Energy

Electricity. Electricity consumption within the SCE Victorville District would increase as a result of the Proposed Action over the estimated closure baseline consumption (Figure 4.2-19). In the short term, through 1995, the overall increase in the electricity demand would remain below an average of



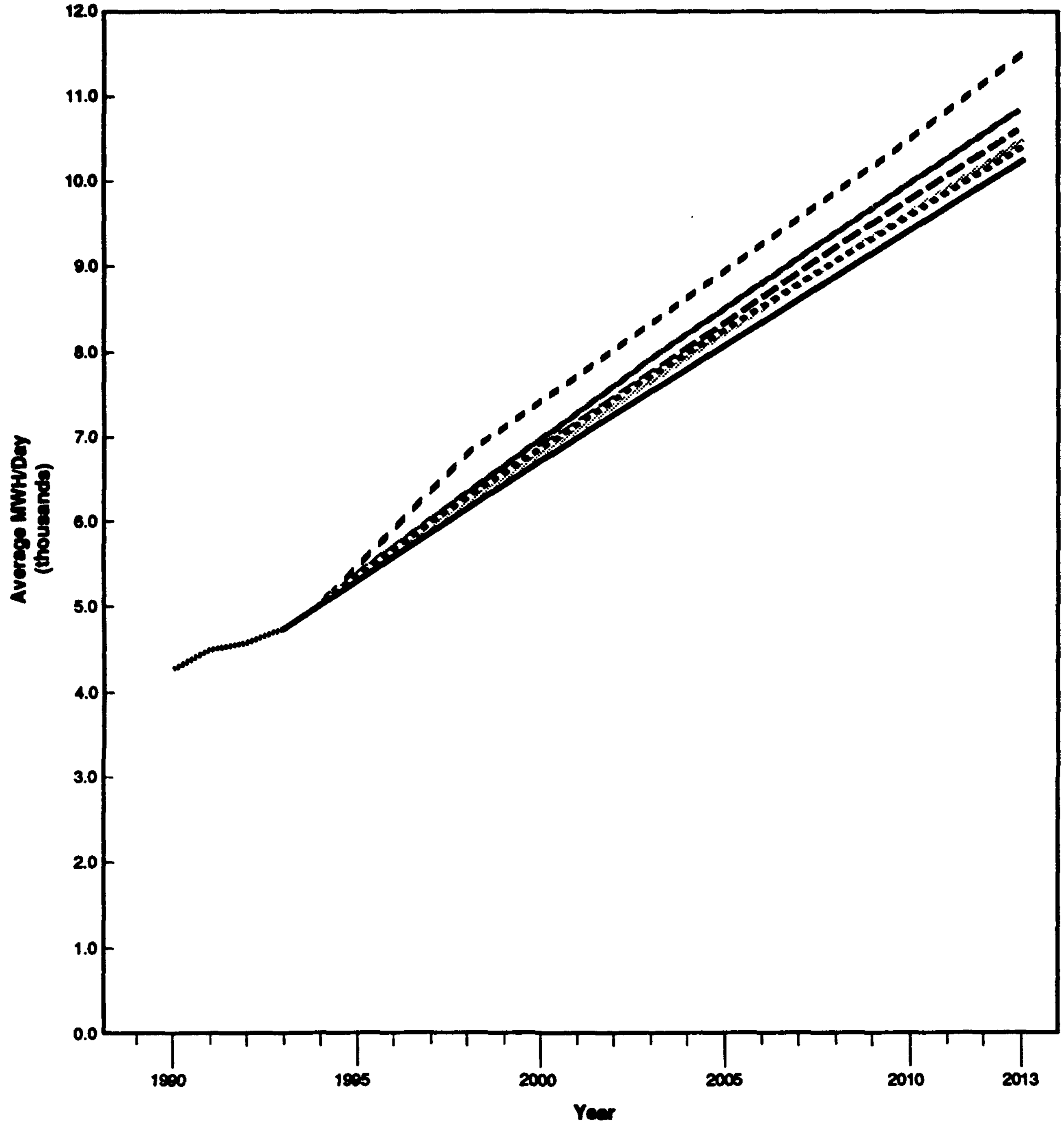
Sources: Based on San Bernardino County Solid Waste Management Dept., 1989, 1991.

EXPLANATION

- No Action
- Proposed Action
- International Airport
- Non-Aviation
- Commercial Airport
- General Aviation Center
- Preclosure

Total Solid Waste Generation-All Alternatives (1990-2013)

Figure 4.2-18



Sources: Based on California Energy Commission, 1990; Southern California Edison, 1991.

EXPLANATION

- No Action
- Proposed Action
- International Airport
- Non-Aviation
- Commercial Airport
- General Aviation Center
- Preclosure

Average Daily Electricity Demand-All Alternatives (1990-2013)

Figure 4.2-19

68.7 MWH per day. By 2013, the overall increase from the Proposed Action would be an average of 580 MWH per day.

Natural Gas. Natural gas consumption within the SWG Victorville District would increase as a result of the Proposed Action over the estimated closure baseline consumption (Figure 4.2-20). By 1995, short-term natural gas demand increases would be approximately 4,000 therms per day. The long-term increase from the Proposed Action would average about 30,500 therms per day by 2013.

Cumulative Impacts. The SST would increase demand in the Victor Valley area. Total electrical demand over the Anaheim to Las Vegas route would be 500,000 kilowatt hours (kwh) per day, and would require 22 substations along the route. SCE has indicated that the company would have no difficulty meeting this additional demand.

The Air Force Base closure and realignment activities in the region (Norton, March, and Edwards AFBs) are not expected to have an impact on utilities in the Victor Valley area.

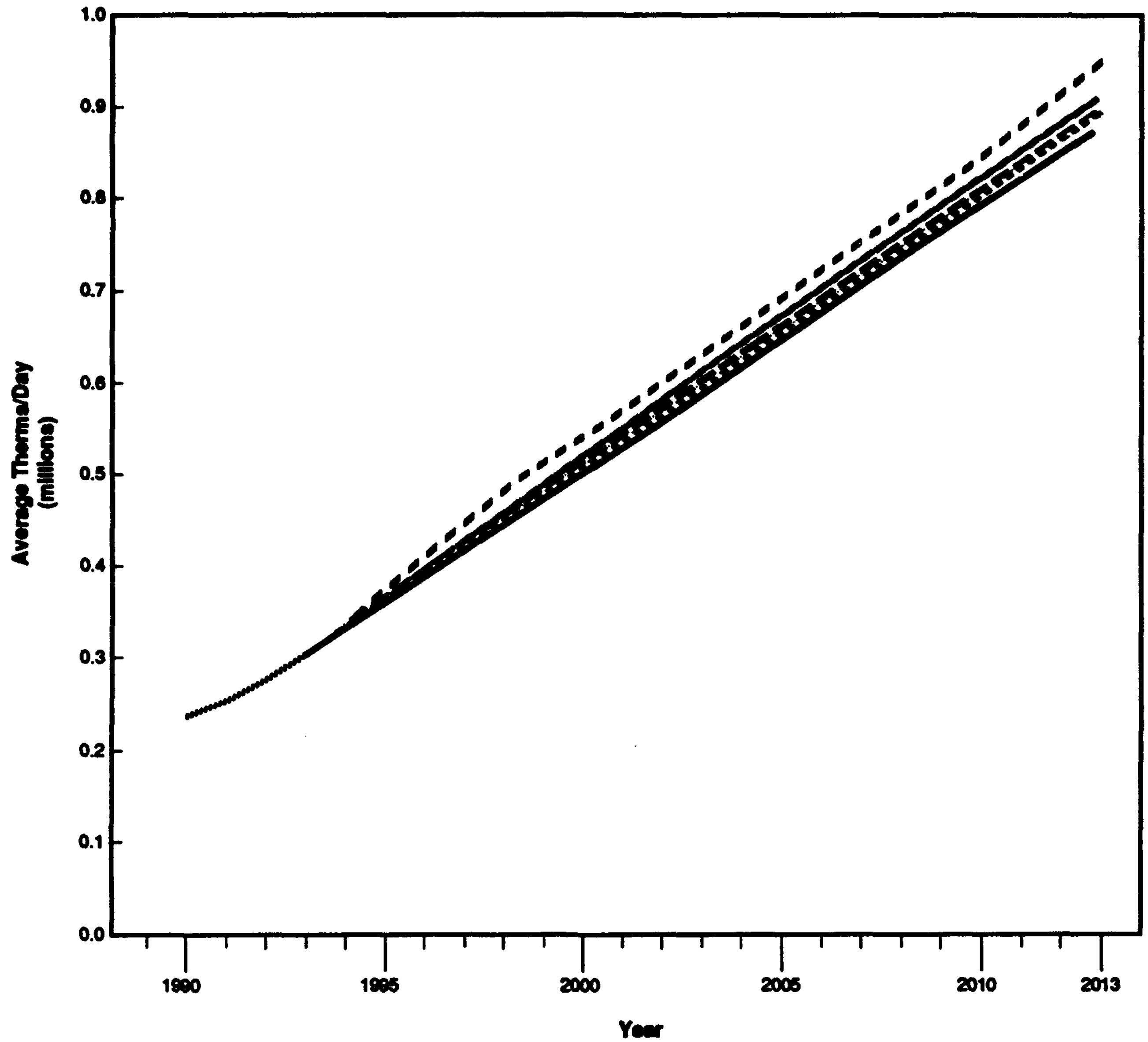
Mitigation Measures. Because the corrective actions required by the VVWRA have not been implemented by the Air Force, new users of the base property would have to implement mitigation measures for wastewater treatments. The type(s) and extent of mitigations cannot at present be specified, because it would be dependent on:

- The specific operating procedures established for the new uses
- The specific products used
- The equipment used on site.

Depending on these factors, new users may have to make provisions for pretreatment of industrial wastewater. New users would also be required to obtain discharge permits in accordance with VVWRA.

4.2.4.2 International Airport Alternative. A summary of estimated changes in utility demand in the Victor Valley region for this alternative is presented in Table 4.2-11.

Water Supply. As a result of the International Airport Alternative, water consumption within the Upper Basin region of the MWA service area would increase over estimated closure baseline consumption (see Figure 4.2-16). By 1995, a short-term increase in water demand would average about 2 MGD. The long-term overall increase from the International Airport Alternative, would be an average of about 13 MGD by 2013.



Source: Based on Southwest Gas Company, 1991.

EXPLANATION

- No Action
- Proposed Action
- International Airport
- Non-Aviation
- Commercial Airport
- General Aviation Center
- Preclosure

Average Daily Natural Gas Demand-All Alternatives (1990-2013)

Figure 4.2-20

Table 4.2-11. Utility Demand Changes in the Victor Valley - International Airport Alternative

	1993	1998	2003	2013
Water Demand				
Upper Basin Region (in MGD)				
Post-closure	40.4	49.7	59.0	77.5
International Airport Alt.	40.4	57.0	67.3	90.4
Change from Post-closure	0.0	7.3	8.3	12.9
Percent Change	0.0	14.7	14.1	16.7
Wastewater Generation				
VVWRA Service Area (in MGD)				
Post-closure	6.7	10.4	15.5	22.5
International Airport Alt.	6.7	12.0	17.8	26.4
Change from Post-closure	0.0	1.6	2.3	3.9
Percent Change	0.0	15.7	14.8	17.1
Solid Waste Generation				
Victor Valley Landfills (in millions of cubic yards per year)				
Post-closure	0.80	1.01	1.22	1.64
International Airport Alt.	0.80	1.16	1.40	1.92
Change from Post-closure	0.0	0.16	0.18	0.28
Percent Change	0.0	15.7	14.8	17.1
Electricity Demand				
SCE Victorville District (in MWH/day)				
Post-closure	4,801	6,192	7,592	10,275
International Airport Alt.	4,801	6,867	8,376	11,511
Change from Post-closure	0	675	784	1,236
Percent Change	0.0	10.9	10.3	12.0
Natural Gas Demand				
SWG Victorville District (in therms/day)				
Post-closure	305,680	446,616	588,698	875,154
International Airport Alt.	305,680	483,270	630,461	940,105
Change from Post-closure	0	36,654	41,763	64,951
Percent Change	0.0	8.2	7.1	7.4

Sources: Based on Mojave Water Agency, 1990; Victor Valley Wastewater Reclamation Authority, 1988; San Bernardino County Solid Waste Management Department, 1989, 1991; California Energy Commission, 1990; Southern California Edison Company, 1991; Southwest Gas Company, 1991.

Infrastructural changes would be required throughout the Victor Valley in the various districts that would experience direct and indirect population changes from this alternative. Under the International Airport Alternative, total demand within the Victor Valley would reach an average of 90.4 MGD by 2013, approximately 12 percent greater than the MWA implicit projection for that year.

The increased population and resulting increase in water demand from the International Airport Alternative would require the MWA and individual water districts in the Victor Valley to make presently planned infrastructural improvements about 4 years ahead of the schedule indicated by the MWA projection. The overall changes to their short- and long-term plans would

accelerate their current planning strategy, which already indicates the need for major changes throughout the next two decades.

Wastewater. Wastewater treatment demand would increase as a result of the International Airport Alternative over estimated closure baseline treatment levels (see Figure 4.2-17). By 1995, the short-term increase in the wastewater treatment demand would average about 0.4 MGD. The long-term increase from this alternative would average about 4 MGD by 2013.

Infrastructural changes would be required throughout the Victor Valley within the various wastewater collection districts that would experience direct and indirect populations changes from the International Airport Alternative. Under the International Airport Alternative, total demand within the region would reach an average of 26.4 MGD by 2013, approximately 12 percent greater than the VVWRA implicit projection for that year.

The increased population and resulting increase in wastewater treatment demand from the International Airport Alternative would require VVWRA and individual wastewater collection agencies in the Victor Valley to make presently-planned long-term infrastructural improvements about 4 years ahead of the schedule indicated by the *Wastewater Master Plan*. The overall changes to their short- and long-term plans would accelerate their current planning strategy, which already indicates the need for major changes throughout the next two decades.

Solid Waste. The four major landfills that accept wastes from the communities in the Victor Valley would increase estimated disposal levels as a result of the International Airport Alternative over those projected for the closure baseline (see Figure 4.2-18).

The existing capacities of the four landfills would be reached by 1992 for the Apple Valley and Victorville landfills, 1996 for Hesperia, and 2006 for Phelan. The additional expansion potential at the Apple Valley and Victorville landfills would be reached by about 2003 under the International Airport Alternative.

Expansion plans for the Hesperia landfill would extend the date that cumulative capacities would be reached in Victor Valley landfills. Source reduction and recycling programs could extend the cumulative landfill expectancies in the Victor Valley. Changes to the county's short- and long-term plans for landfill capacity expansion in the Victor Valley would not be substantially altered under this alternative.

Energy

Electricity. Electricity consumption within the SCE Victorville District would increase as a result of the International Airport Alternative over the estimated

closure baseline consumption (see Figure 4.2-19). By 1995, the short-term increase in the electricity demand would average about 185 MWH per day. By 2013, the long-term increase from the International Airport Alternative would average about 1,240 MWH per day.

Natural Gas. Natural gas consumption within the SWG Victorville District would increase as a result of the International Airport Alternative over the estimated closure baseline consumption (see Figure 4.2-20). In the short term, through 1995, the overall increase in the natural gas demand would average about 10,300 therms per day. By 2013, the overall increase from this alternative would average about 64,950 therms per day.

Cumulative Impacts. The cumulative impacts for this alternative are the same as stated for the Proposed Action.

Mitigation Measures. New users would be required to implement mitigation measures as discussed for the Proposed Action (Section 4.2.4.1).

4.2.4.3 Commercial Airport with Residential Alternative. Table 4.2-12 presents a summary of utility demand changes associated with the Commercial Airport with Residential Alternative.

Water Supply. This alternative would result in increased water consumption over estimated closure baseline consumption within the Upper Basin region of the MWA service area (see Figure 4.2-16). The short-term increase in water demand would average about 0.6 MGD by 1995. The long-term increase from this alternative would be an average of 3.2 MGD by 2013.

Infrastructural changes may be required within parts of the Victor Valley in the various districts that would experience direct and indirect populations changes from this alternative. Extrapolation of the trend indicated by the MWA projection of water demand in the Victor Valley in 2010, indicates that total water demand would reach an average of about 80.7 MGD by 2013. Under this alternative, total demand within the Victor Valley would reach about the same level, 80.7 MGD by 2013, as the MWA implicit projection for that year.

The increase in population from this alternative is about the same as the projected decrease resulting from base closure. Because the projections made by the MWA included the current demand from George AFB overall, there would be no real change in the agency water demand projections. The agency and individual water districts in the Victor Valley would still need to make presently planned infrastructural improvements at about the same schedule and there would not be any change to their short- or long-term plans for major changes throughout the next two decades.

Table 4.2-12. Utility Demand Changes in the Victor Valley - Commercial Airport with Residential Alternative

	1993	1998	2003	2013
Water Demand				
Upper Basin Region (in MGD)				
Post-closure	40.4	49.7	59.0	77.5
Commercial Airport/Residential Alt.	40.4	50.8	60.9	80.7
Change from Post-closure	0.0	1.1	2.0	3.2
Percent Change	0.0	2.3	3.4	4.2
Wastewater Generation				
VVWRA Service Area (in MGD)				
Commercial Airport/Residential Alt.				
Post-closure	6.7	10.4	15.5	22.5
	6.7	10.7	16.1	23.5
Change From Post-closure	0.0	0.3	0.5	1.0
Percent Change	0.0	2.5	3.5	4.2
Solid Waste Generation				
Victor Valley Landfills (in millions of cubic yards per year)				
Post-closure	0.80	1.01	1.22	1.64
Commercial Airport/Residential Alt.	0.80	1.03	1.26	1.71
Change from Post-closure	0.0	0.02	0.04	0.07
Percent Change	0.0	2.5	3.5	4.2
Electricity Demand				
SCE Victorville District (in MWH/day)				
Post-closure	4,801	6,192	7,592	10,275
Commercial Airport/Residential Alt.	4,801	6,298	7,778	10,582
Change from Post-closure	0	106	186	307
Percent Change	0.0	1.0	1.6	2.7
Natural Gas Demand				
SWG Victorville District (in therms/day)				
Future	305,680	446,616	588,698	875,154
Commercial Airport/Residential Alt.	305,680	452,367	598,628	891,293
Change from Post-closure	0	5,751	9,930	16,139
Percent Change	0.0	1.3	1.7	1.8

Sources: Based on Mojave Water Agency, 1990; Victor Valley Wastewater Reclamation Authority, 1988; San Bernardino County Solid Waste Management Department, 1989, 1991; California Energy Commission, 1990; Southern California Edison Company, 1991; Southwest Gas Company, 1991.

Wastewater. Wastewater treatment demand would increase as a result of the Commercial Airport with Residential Alternative over estimated closure baseline treatment levels (see Figure 4.2-17). By 1995, the short-term increase in the wastewater treatment demand would average about 0.2 MGD. The long-term increase from this alternative would average about 1.0 MGD by 2013.

Some infrastructural changes may be required within the various Victor Valley wastewater collection agencies that could experience direct and indirect population changes from this alternative. Under this alternative, total demand within the VVWRA service area would reach an average of 23.5 MGD by 2013, approximately the same as the VVWRA implicit projection for that year.

Because the increase in population from this alternative is about the same as the projected decrease resulting from base closure and the projections made by VVWRA included the current demand from George AFB, there would be a no change in the authority's wastewater treatment demand projections. VVWRA and individual wastewater collection agencies in the Victor Valley would still need to make presently planned long-term infrastructural improvements at about the same schedule. There would not be any substantial changes to their short- or long-term plans for major changes throughout the next two decades.

Solid Waste. Solid waste disposal at Victor Valley landfills would increase as a result of the this alternative over estimated closure baseline disposal levels (see Figure 4.2-18). The four Victor Valley landfills would reach their existing capacity level by 1992 for the Apple Valley and Victorville landfills, 1996 for Hesperia, and 2006 for Phelan. The additional expansion potential at the Apple Valley and Victorville landfills would be reached by about 2004 under this alternative. Expansion plans for the Hesperia landfill would extend the date that cumulative capacities would be reached in Victor Valley landfills. Source reduction and recycling programs could extend the cumulative landfill expectancies in the Victor Valley. Changes to the county's short- and long-term plans for landfill capacity expansion in the Victor Valley would not be substantially altered under this alternative.

Energy

Electricity. Electricity consumption within the SCE Victorville District would increase as a result of the Commercial Airport with Residential Alternative over the estimated closure baseline consumption (see Figure 4.2-19). Short-term increases in electricity demand would average 58 MWH per day in 1995. By 2013, the increase from this alternative would average over 300 MWH per day.

Natural Gas. Natural gas consumption within the SWG Victorville District would increase over the estimated closure baseline consumption as a result of this alternative (see Figure 4.2-20). In the short term, the increase in natural gas demand would average about 3,200 therms per day by 1995. In 2013, the long-term increase from the Commercial Airport with Residential Alternative would be an average of about 16,100 therms per day.

Cumulative Impacts. The cumulative impacts for this alternative are the same as stated for the Proposed Action.

Mitigation Measures. New users would be required to implement mitigation measures as discussed for the Proposed Action (see Section 4.2.4.1).

4.2.4.4 General Aviation Center Alternative. Table 4.2-13 presents a summary of utility demand changes associated with the General Aviation Center Alternative.

Table 4.2-13. Utility Demand Changes in the Victor Valley - General Aviation Center Alternative

	1993	1998	2003	2013
Water Demand				
Upper Basin Region (in MGD)				
Post-closure	40.4	49.7	59.0	77.5
General Aviation Center Alt.	40.4	51.2	61.0	79.7
Change from Post-closure	0.0	1.5	2.0	2.2
Percent Change	0.0	3.0	3.5	2.9
Wastewater Generation				
VVWRA Service Area (in MGD)				
Post-closure	6.7	10.4	15.5	22.5
General Aviation Center Alt.	6.7	10.7	16.1	23.2
Change from Post-closure	0.0	0.3	0.6	0.7
Percent Change	0.0	3.2	3.6	2.9
Solid Waste Generation				
Victor Valley Landfills (in millions of cubic yards per year)				
Post-closure	0.80	1.01	1.22	1.64
General Aviation Center Alt.	0.80	1.04	1.26	1.69
Change from Post-closure	0.0	0.03	0.04	0.05
Percent Change	0.0	3.2	3.6	2.9
Electricity Demand				
SCE Victorville District (in MWH/day)				
Post-closure	4,801	6,192	7,592	10,275
General Aviation Center Alt.	4,801	6,329	7,784	10,486
Change from Post-closure	0	137	192	211
Percent Change	0.0	2.2	2.5	2.1
Natural Gas Demand				
SWG Victorville District (in therms/day)				
Post-closure	305,680	446,616	588,698	875,154
General Aviation Center Alt.	305,680	454,072	598,943	886,263
Change from Post-closure	0	7,456	10,245	11,110
Percent Change	0.0	1.7	1.7	1.3

Sources: Based on Mojave Water Agency, 1990; Victor Valley Wastewater Reclamation Authority, 1988; San Bernardino County Solid Waste Management Department, 1989, 1991; California Energy Commission, 1990; Southern California Edison Company, 1991; Southwest Gas Company, 1991.

Water Supply. This alternative would result in increased water consumption over estimated closure baseline consumption within the Upper Basin region of

the MWA service area (see Figure 4.2-16). The short-term increase in water demand would average about 0.7 MGD by 1995. The long-term increase from this alternative would be an average of 2.2 MGD by 2013.

Infrastructural changes may be required within parts of the Victor Valley in the various districts that would experience direct and indirect population changes from this alternative. Extrapolation of the trend indicated by the MWA projection of water demand in the Victor Valley in 2010, indicates that total water demand would reach an average of about 80.7 MGD by 2013. Under this alternative, total demand within the Victor Valley would reach about the same level, 79.7 MGD by 2013, as the MWA implicit projection for that year.

The increase in population from this alternative is slightly less than the projected decrease resulting from base closure. Because the projections made by the MWA included the current demand from George AFB overall, there would be a slight decrease in the agency water demand projections. The agency and individual water districts in the Victor Valley would still need to make presently-planned infrastructural improvements at about the same schedule. There would not be any substantial changes to their short- or long-term plans for major changes throughout the next two decades.

Wastewater. Wastewater treatment demand would increase as a result of the General Aviation Center Alternative over estimated closure baseline treatment levels (see Figure 4.2-17). By 1995, the short-term increase in the wastewater treatment demand would average about 0.1 MGD. The long-term increase from this alternative would average 0.7 MGD by 2013.

Some infrastructural changes may be required within the various Victor Valley wastewater collection agencies that could experience direct and indirect population changes from this alternative. Under this alternative, total demand within the VVWRA service area would reach an average of 23.2 MGD by 2013, approximately the same as the VVWRA implicit projection for that year.

Because the increase in population from this alternative is slightly less than as the projected decrease resulting from base closure and the projections made by VVWRA included the current demand from George AFB, there would be a slight decrease in the authority's wastewater treatment demand projections. VVWRA and individual wastewater collection agencies in the Victor Valley would still need to make presently-planned long-term infrastructural improvements at about the same schedule. There would not be any substantial changes to their short- or long-term plans for major changes throughout the next two decades.

Solid Waste. Solid waste disposal at Victor Valley landfills would increase as a result of this alternative overestimated closure baseline disposal levels (see Figure 4.2-18). The four Victor Valley landfills would reach their existing capacity level by 1992 for the Apple Valley and Victorville landfills, 1996 for

Hesperia, and 2006 for Phelan. The additional expansion potential at the Apple Valley and Victorville landfills would be reached by about 2004 under this alternative. Expansion plans for the Hesperia landfill would extend the date that cumulative capacities would be reached in Victor Valley landfills. Source reduction and recycling programs could extend the cumulative landfill expectancies in the Victor Valley. Changes to the county's short- and long-term plans for landfill capacity expansion in the Victor Valley would not be substantially altered under this alternative.

Energy

Electricity. Electricity consumption within the SCE Victorville District would increase as a result of the General Aviation Center Alternative over the estimated closure baseline consumption (see Figure 4.2-19). Short-term increases in electricity demand would average 32 MWH per day in 1995. By 2013, the increase from this alternative would average about 210 MWH per day.

Natural Gas. Natural gas consumption within the SWG Victorville District would increase over the estimated closure baseline consumption as a result of this alternative (see Figure 4.2-20). In the short term, the increase in natural gas demand would average about 1,751 therms per day by 1995. In 2013, the long-term increase from the General Aviation Center Alternative would be an average of about 11,100 therms per day.

Cumulative Impacts. The cumulative impacts for this alternative are the same as stated for the Proposed Action.

Mitigation Measures. New users would be required to implement mitigation measures as discussed for the Proposed Action (see Section 4.2.4.1).

4.2.4.5 Non-Aviation Alternative. Table 4.2-14 presents a summary of utility demand changes associated with this alternative.

Water Supply. The Non-Aviation Alternative would also increase water consumption within the Upper Basin region of the MWA service area over estimated closure baseline consumption (see Figure 4.2-16). By 1995, the short term increase in water demand would average about 0.3 MGD. The long-term overall increase from this alternative would be an average of 2.8 MGD by 2013.

Infrastructural changes could be required within any Victor Valley district that experiences direct or indirect population changes from this alternative. Under this alternative, total demand within the Victor Valley would reach an average of 80.3 MGD by 2013, slightly less than the MWA implicit projection for that year.

Table 4.2-14. Utility Demand Changes in the Victor Valley - Non-Aviation Alternative

	1993	1998	2003	2013
Water Demand				
Upper Basin Region (in MGD)				
Post-closure	40.4	49.7	59.0	77.5
Non-Aviation Alt.	40.4	50.4	60.2	80.3
Change from Post-closure	0.0	0.7	1.2	2.8
Percent Change	0.0	1.4	2.2	3.7
Wastewater Generation				
VVWRA Service Area (in MGD)				
Post-closure	6.7	10.4	15.5	22.5
Non-Aviation Alt.	6.7	10.6	15.9	23.4
Change from Post-closure	0.0	0.2	0.4	0.9
Percent Change	0.0	1.5	2.3	3.8
Solid Waste Generation				
Victor Valley Landfills (in millions of cubic yards per year)				
Post-closure	0.80	1.01	1.22	1.64
Non-Aviation Alt.	0.80	1.02	1.25	1.70
Change from Post-closure	0.0	0.02	0.03	0.06
Percent Change	0.0	1.5	2.3	3.8
Electricity Demand				
SCE Victorville District (in MWH/day)				
Post-closure	4,801	6,192	7,592	10,275
Non-Aviation Alt.	4,801	6,257	7,714	10,547
Change from Post-closure	0	65	122	272
Percent Change	0.0	1.0	1.6	2.7
Natural Gas Demand				
SWG Victorville District (in therms/day)				
Post-closure	305,680	446,616	588,698	875,154
Non-Aviation Alt.	305,680	450,118	595,214	889,479
Change from Post-closure	0	3,502	6,516	14,325
Percent Change	0.0	0.8	1.1	1.6

Sources: Based on Mojave Water Agency, 1990; Victor Valley Wastewater Reclamation Authority, 1988; San Bernardino County Solid Waste Management Department, 1989, 1991; California Energy Commission, 1990; Southern California Edison Company, 1991; Southwest Gas Company, 1991.

The increase in population from this alternative is slightly less than the projected decrease resulting from base closure. Because the projections made by the MWA included the current demand from George AFB, there would be a slight decrease in the MWA water demand projections. The MWA and individual water districts in the Victor Valley would still need to make presently-planned infrastructural improvements at about the same schedule. There would not be any substantial changes to their short- or long-term plans for major changes throughout the next two decades.

Wastewater. Demand for wastewater treatment would increase as a result of the Non-Aviation Alternative over estimated closure baseline treatment levels (see Figure 4.2-17). By 1995, the short-term increase in the wastewater treatment demand would average about 0.1 MGD. The long-term increase from this alternative would average 0.9 MGD by 2013.

Some infrastructural changes may be required within the Victor Valley wastewater collection agencies that experience direct or indirect populations changes from this alternative. Under the Non-Aviation Alternative, total demand within the region would reach an average of 23.4 MGD by 2013, slightly less than the VVWRA implicit projection for that year. Under the Non-Aviation Alternative, since the VVWRA presently has other unincorporated areas of San Bernardino County in the Victor Valley as members, it is likely that a contractual or other type of arrangement could be made to include the base site into the service area of the VVWRA regional treatment plant.

Because the increase in population from this alternative is slightly less than the projected decrease resulting from base closure and the projections made by the VVWRA included the current demand from George AFB, there would be a slight decrease in the authority's wastewater treatment demand projections. The VVWRA and individual wastewater collection agencies in the Victor Valley would still need to make presently planned long-term infrastructural improvements at about the same schedule. There would not be any substantial changes to their short- or long-term plans for major changes throughout the next two decades.

Solid Waste. Solid waste disposal at Victor Valley landfills would increase as a result of the this alternative over estimated closure baseline disposal levels (see Figure 4.2-18).

The Victor Valley landfills would reach their existing capacity levels by 1992 for Apple Valley and Victorville landfills, 1996 for Hesperia, and 2006 for Phelan 1994. The additional expansion potential at the Apple Valley and Victorville landfills would be reached by about 2004 under this alternative. Expansion plans for the Hesperia landfill would extend the date that cumulative capacities would be reached in Victor Valley landfills. Source reduction and recycling programs could extend the cumulative landfill expectancies in the Victor Valley. Changes to the county's short- and long-term plans for landfill capacity expansion in the Victor Valley would not be substantially altered under this alternative.

Energy

Electricity. Electricity consumption within the SCE Victorville District would increase as a result of the Non-Aviation Alternative over estimated closure baseline consumption levels (see Figure 4.2-19). Short-term increases in

electricity demand would average nearly 25 MWH per day by 1995. Long-term increases from this alternative would average about 270 MWH per day by 2013.

Natural Gas. Natural gas consumption within the SWG Victorville District would increase as a result of the Non-Aviation Alternative over the estimated closure baseline consumption (see Figure 4.2-20). In the short term, through 1995, the overall increase in the natural gas demand would average about 1,400 therms per day. By 2013, the increase from the Non-Aviation Alternative would average about 14,300 therms per day.

Cumulative Impacts. The cumulative impacts for this alternative are the same as stated for the Proposed Action.

Mitigation Measures. New users would be required to implement mitigation measures as discussed for the Proposed Action (Section 4.2.4.1).

4.2.4.6 Other Land Use Concepts. Changes in utility demand within each utility purveyors' service area resulting from the federal transfers and independent land use concepts would be generally commensurate with population changes resulting from these activities.

U.S. Department of Justice. This reuse component, when overlaid with the Proposed Action and International Airport Alternative, would cause an estimated net reduction of approximately 2,480 direct on-site jobs to each of those reuse concepts. This reduction represents about 10 percent of the total direct on-site jobs for the Proposed Action and about 5 percent of the total direct on-site jobs for the International Airport Alternative. If population in-migration were assumed to decrease by the same proportion as the estimated reduction in jobs, utility demand would also decline by about the same proportions (i.e., about 10 percent for the Proposed Action and 5 percent for the International Airport Alternative). This reuse component, when overlaid with the Commercial Airport with Residential and Non-Aviation alternatives, would cause a net increase of about 1,000 direct on-site jobs. This change represents about 5 and 8 percent of the total direct on-site jobs for these alternatives, respectively. If population in-migration were assumed to increase by the same proportions as the estimated change in jobs, utility demand would also increase by about the same proportion (i.e., about 5 percent for the Commercial Airport with Residential and about 8 percent for the Non-Aviation Alternative).

U.S. Department of Interior. This reuse component, when overlaid with the Proposed Action, would cause an estimated net reduction of 960 direct on-site jobs or about 3.8 percent of the total direct on-site jobs for the Proposed Action. Using the same assumptions stated previously, utility demand would also decline by about 3.8 percent.

U.S. Department of Housing and Urban Development. This reuse component, when overlaid with the Proposed Action would cause an estimated net reduction of 677 direct on-site jobs, or about 5 percent of the total direct on-site jobs for the Proposed Action. Using the same assumptions stated previously, utility demand would also decline by about 5 percent. When overlaid with the International Airport Alternative, on-site direct jobs would be reduced by about 3 percent; if population reductions were of similar magnitude, utility demand would likely decrease by the same proportionate amount.

San Bernardino County Work Furlough Program. This reuse component, when overlaid with the Proposed Action would cause an estimated net reduction of 480 direct on-site jobs, or about 5 percent of the total direct on-site jobs for the Proposed Action. Using the same assumptions stated previously, utility demand would also decline by about 5 percent. When overlaid with the International Airport Alternative, on-site direct jobs would be reduced by a negligible amount; utility demand changes would also likely be negligible.

U.S. Department of Education. No measurable change in utility requirements would be anticipated for this federal transfer concept when overlaid with any of the reuse alternatives.

Medical Facilities. Changes in on-site direct jobs and utility requirements are undetermined for this federal transfer concept when overlaid with any of the reuse alternatives.

4.2.4.7 No-Action Alternative. Impacts of the No-Action Alternative would be as described in Section 3.2.4 as closure baseline conditions.

Cumulative Impacts. The SST would increase electrical demand in the Victor Valley area. Total electrical demand over the Anaheim to Las Vegas route would be 500,000 kwh per day, and would require 22 substations along the route. SCE has indicated that the company would have no difficulty meeting this additional demand.

Air Force Base closure and realignment activities in the region (Norton, March, and Edwards AFBs) are not expected to have an impact on utilities in the Victor Valley area.

Mitigation Measures. No mitigation measures would be required under this alternative.

4.3 HAZARDOUS MATERIALS/HAZARDOUS WASTE

This section addresses the potential impacts of existing contaminated sites on the various reuse options, and the potential for environmental impacts caused by hazardous materials/waste management practices associated with the reuse options. Hazardous materials/wastes, IRP sites, storage tanks, asbestos, pesticides and herbicides, PCBs, radon, and medical/biohazardous wastes will be discussed within this section.

The U.S. Air Force is committed to the remediation of all contamination at George AFB due to past Air Force activities. The DMT will remain after base closure to coordinate cleanup activities. Delays or restrictions in reuse or disposal of property may occur due to the extent of contamination and the results of both the risk assessment and remedial designs determined for contaminated sites. Examples of possible land use restrictions would be the capping of landfills and the constraints from methane generation and cap integrity; as well as the location of long-term monitoring wells. These restrictions would have to be considered in the layout of future development. Options to developers include creation of parks, greenbelts or open spaces over and around such areas.

Regulatory standards and guidelines will be applied in determining the impacts caused by hazardous materials/waste. The following criteria were used to identify potential impacts:

- Accidental release of friable asbestos during the demolition or modification of a structure
- Generation of 100 kilograms (or more) of hazardous waste or 1 kilogram (or more) of an acutely (California Health and Safety Code Chapter 6.95, Section 25532) hazardous waste in a calendar month, resulting in increased regulatory requirements
- New operational requirements or service for all UST and tank systems
- Any spill or release of a reportable quantity of a hazardous material
- Manufacturing of any compound that requires notifying the pertinent regulatory agency
- Exposure of the environment or public to any hazardous material through release or disposal practices.

4.3.1 Proposed Action

Hazardous Materials Management. The hazardous materials applicable to the operation of a commercial airport are summarized in Table 4.3-1. The types of hazardous materials used in relation to the Proposed Action would be similar to those used prior to closure, specifically for aviation-related maintenance and fuel transportation. The quantities of hazardous materials utilized under the Proposed Action will be greater than those used under closure baseline conditions.

Table 4.3-1. Hazardous Material Usage - Proposed Action

Land Use Zones	Operation Process	Hazardous Materials
Airfield	Refueling; anti-/de-icing; utilization of clear zones, runways, taxiways, airport terminal parking, administration offices, corporate and private aviation facilities, aircraft parking	Aviation fuels, propylene glycol, ethylene glycol, heating oils
Aviation Support	Operations associated with aircraft maintenance and manufacturing, aeronautics research and development, air transportation-related industry and warehousing, law enforcement, airline maintenance, other governmental administrative services	Fuels, solvents, paints, degreasers, corrosives, heavy metals, reactives, thinners, ignitables, heating oils, plating waste, cyanides, laboratory waste
Industrial (Business Park)	Activities associated with light industry, research and development, warehousing, and manufacturing	Solvents, heavy metals, corrosives, catalysts, aerosols, fuels, heating oils
Commercial (Office/Business Park)	Activities associated with offices, light industry, research and development, and higher value warehousing	Fuels, solvents, corrosives, ignitables, heating oils, pesticides, herbicides, fungicides
Public/Recreation	Maintenance of existing recreational facilities and golf course	Pesticides, fungicides, herbicides, chlorine, heating oils
Vacant Land	Vacant	Pesticides, fungicides, herbicides

Currently, handling of hazardous materials on the base is managed by DOD. If the Proposed Action were implemented, each separate organization within the commercial airport structure would be responsible for the management of hazardous materials according to applicable regulations. Additionally, each organization would have to comply with SARA, Section 311, Title III, which requires that local communities be informed of the use of hazardous materials.

Hazardous Waste Management. The six proposed land use zones (see Table 4.3-1) would host many operations that are yet to be defined. This section describes the types of hazardous wastes that may be generated in these land use zones.

Once the responsibilities of hazardous waste management are allocated to individual organizations, proficiency with those materials and spill responses is required by OSHA regulations (29 CFR). Mutual aid agreements with surrounding communities may require additional scrutiny and training of emergency staff.

The presence of numerous independent owner/operators on the base would change the regulatory requirements and probably increase the regulatory burden relative to hazardous waste management. Activities associated with the Proposed Action would lead to an increase in the amount of hazardous waste generated compared to the closure baseline.

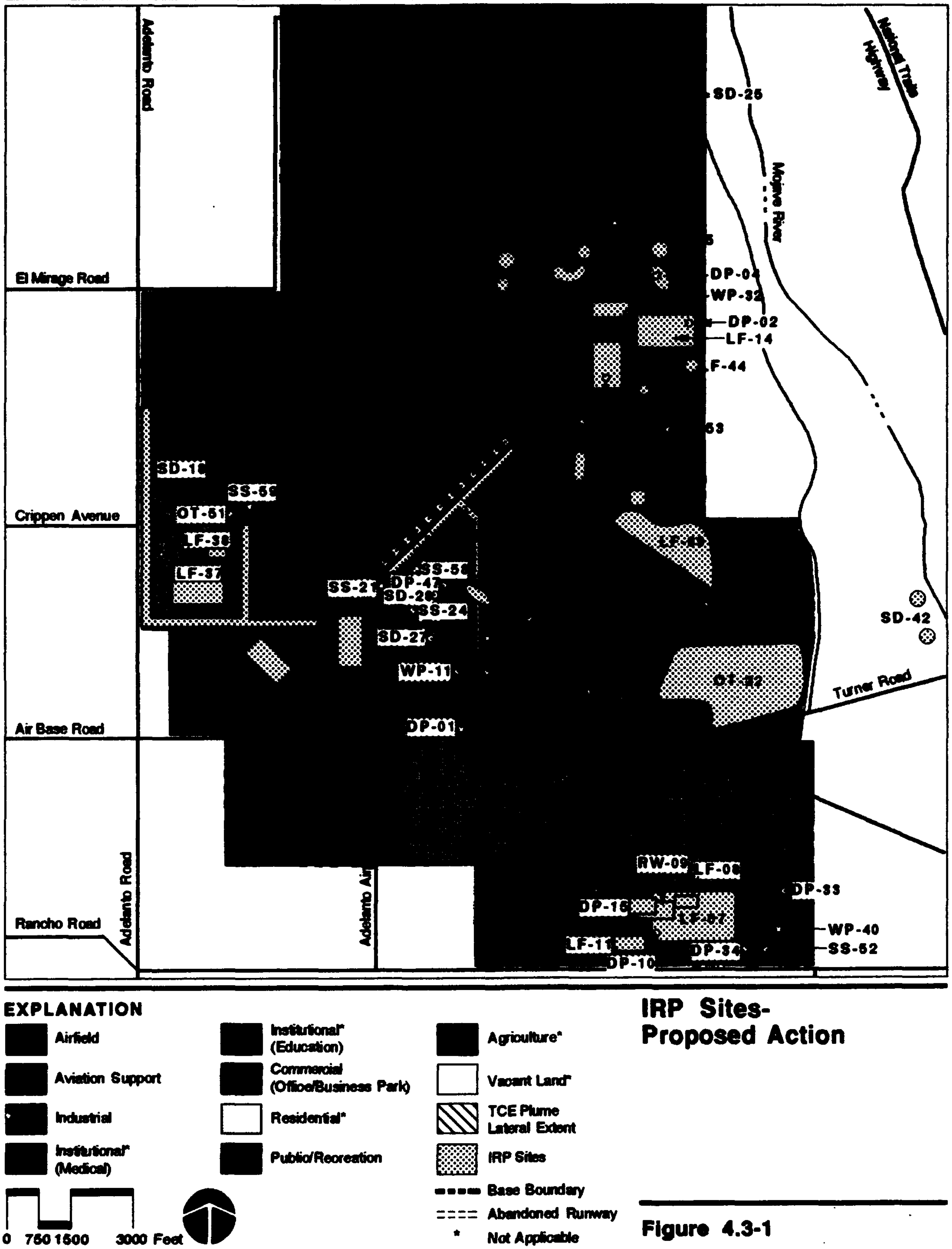
Installation Restoration Program Sites. The U.S. Air Force is committed to continue IRP activities under DERP, CERCLA, and the FFA between the U.S. Air Force, U.S. EPA, California DHS, and the California water quality control board. IRP activities will be coordinated by the DMT and the aforementioned agencies.

The extent of contamination is being delineated and both the risk assessment and remedial designs will be a result of this work. Proposed disposal and reuse of some George AFB properties may be delayed or limited due to the extent of contamination as well as ongoing and future IRP activities (Figure 4.3-1). This process will also identify current and future monitoring of well locations and consider land use limitations as a result of their presence.

Ultimate decisions on what type of future land use will be implemented at areas overlying or adjacent to an IRP site will greatly depend on the overall characterization of risk to human health posed by the IRP site. This risk assessment is an integral part of the remedial investigation to be conducted at IRP sites. Part of the risk assessment involves estimates of exposure to contaminants under future land use conditions at the site. This assessment provides an understanding of the potential exposures to contaminants in the future and may reveal that the site will not support some potential future land uses.

The IRP sites within each land use area for the Proposed Action are summarized in Table 4.3-2.

- **Airfield** - Cleanup activities associated with the industrial storm drain system are to be completed prior to closure, and are not expected to impact flightline operations along the main apron or the proposed airfield expansion into the existing cantonment area. Cleanup efforts associated with a number of landfills and dump sites in the Northeast Disposal Area may impact flight operations. Spill sites at the southwest end of the main runways are not anticipated to impact flight operations. Land use restriction may occur based on number and location of monitoring wells.
- **Aviation Support** - The proposed construction of aviation support areas may be delayed by cleanup activities associated with the TCE groundwater contamination as well as numerous landfills/dump sites within the Northeast Disposal Area. Cleanup activities for sites LF-13 and LF-14 have not been determined. Cleanup efforts within the Central Disposal Area may delay aviation support and industrial reuse development proposed for that area. Monitoring and extraction well locations may delay or restrict reuse.



IRP Sites-Proposed Action

Figure 4.3-1

Table 4.3-2. IRP Sites within Land Use Areas - Proposed Action

Proposed Land Use	IRP Sites
Airfield	TCE Groundwater Plume, Liquid Fuel Distribution System (ST-67), Industrial Storm Drain (SD-25), DP-03, DP-04, DP-60, LF-13, LF-35, LF-36, LF-43, LF-45, SD-18, SD-41, SS-30, ST-54, ST-57
Aviation Support	TCE Groundwater Plume, Liquid Fuel Distribution System (ST-67), Industrial Storm Drain (SD-25), DP-02, DP-04, DP-46, FT-19, FT-19a, FT-20, LF-13, LF-14, LF-44, SS-53, SS-55, ST-56, WP-11, WP-26, WP-29, WP-32
Industrial	Liquid Fuel Distribution System (ST-67), Industrial Storm Drain (SD-25), DP-01, DP-10, DP-15, DP-33, DP-34, LF-07, LF-08, LF-11, LF-35, LF-37, LF-38, OT-51, RW-09, SD-18, SD-27, SD-28, SS-21, SS-24, SS-52, SS-58, SS-59, WP-40
Commercial	Liquid Fuel Distribution System (ST-67), DP-47, LF-12, LF-39, OT-48, SS-23, SS-55, WP-16
Public/Recreation	OT-22
Vacant Land	SD-42

- **Industrial** - Cleanup activities associated with numerous landfills and dumpsites within the West Perimeter Disposal area and Southeast Disposal Area as well as spill sites within the Central Disposal Area may delay industrial development under the Proposed Action.
- **Commercial** - Various IRP sites including a POL leach field, salvage yard, landills, and spill sites could delay reuse due to clean-up activities.
- **Public/Recreation** - Reuse of this area should not be affected by IRP site OT-22.
- **Vacant Land** - IRP site SD-42 should not impact the base reuse under the proposed action.

Underground/Aboveground Storage Tanks. Air flight and maintenance operations associated with the Proposed Action would require the use of aboveground storage tanks and USTs. These tanks must be in compliance with federal, state, and local regulations regarding leak, spill, and overfill protection, and liability insurance.

Asbestos. Renovation and demolition of existing structures with ACM may occur with reuse development. Such activities will comply with all applicable federal, state and local regulations. The number of structures with ACM is unknown; an asbestos survey is currently in progress.

Pesticides and Herbicides. Pesticide and herbicide usage associated with the Proposed Action would increase over amounts currently used, as a result of the increase in Public/Recreation and Commercial land uses. Management practices would conform with FIFRA and state regulations.

PCBs. All federally regulated PCB-contaminated equipment (50 to 499 ppm) will be removed prior to base closure; therefore, these materials will not create any impacts. PCB items (5 to 49 ppm) remaining after base closure will be managed in compliance with state regulations.

Radon. All radon screening survey results were below EPA's recommended mitigation level of 4 pCi/l of air; therefore, no further action is required and radon will have no impact on reuse activities.

Medical/Biohazardous Waste. All of these materials will be incinerated and removed prior to base closure. Accordingly, these materials will not present any impact.

Cumulative Impacts. The Proposed Action would not result in any cumulative impacts.

Mitigation Measures. A hazardous materials and waste planning committee comprising new base users could be established. This planning body could reduce the costs of environmental compliance training, waste management, and mutual spill response.

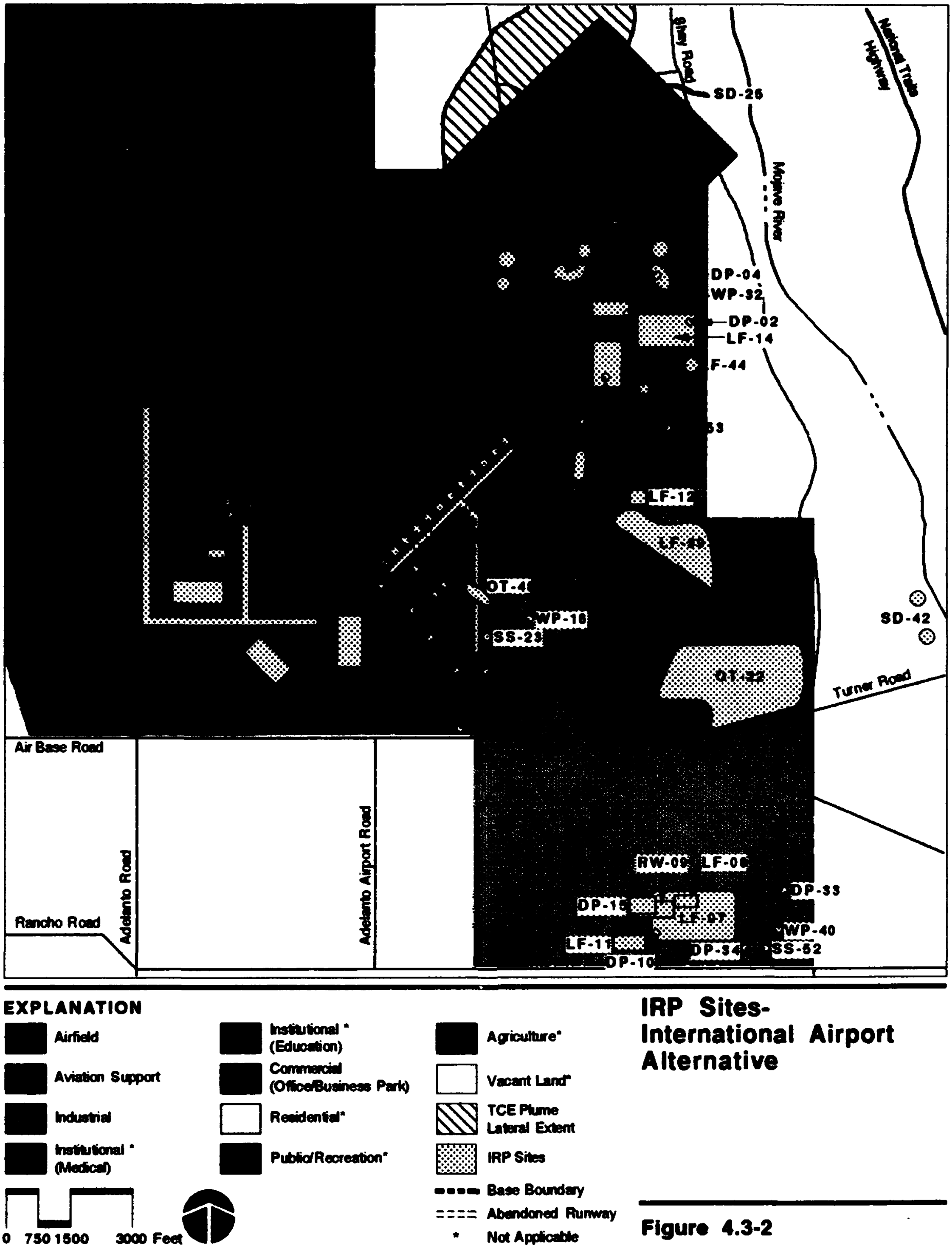
All of the IRP sites may not need to be remediated; however, all of them must be addressed and properly closed out. Active coordination between the Air Force's IRP representative and new construction planning agencies would mitigate potential problems. The presence of IRP sites may limit certain land uses within overlying areas; options could include reuse as open space, green-belt or parks.

Coordination between asbestos removal and new construction or renovation actions would avoid any potential asbestos impacts. Compliance with the NESHAP would avoid potential exposure to asbestos during construction and/or renovation activities.

4.3.2 International Airport Alternative

Hazardous Materials Management. The Proposed Action and the International Airport Alternative primarily differ in magnitude of land use zones (Figure 4.3-2). The hazardous materials that would be used in operations of the International Airport are summarized in Table 4.3-3. The quantities of hazardous materials used and hazardous waste generated would be greater than under the Proposed Action, as a result of increased major aircraft activities associated with an International Airport.

Currently, handling of hazardous materials on the base is managed by DOD. If the International Airport Alternative were implemented, each separate organization within the commercial airport structure would be responsible for the management of hazardous materials according to applicable regulations. Additionally, each organization would have to comply with SARA, Section 311, Title III, which requires that local communities be informed of the use of hazardous materials.



IRP Sites-International Airport Alternative

Figure 4.3-2

Table 4.3-3. Hazardous Material Usage - International Airport Alternative

Land Use Zones	Operation Process	Hazardous Materials
Airfield	Refueling, clear zones, runways, taxiways, airport terminal	Aviation fuels, propylene glycol, ethylene glycol, heating oils
Aviation Support	Corporate, helicopter, general aviation use, flight line buildings, aircraft parking and industry, air cargo	Fuels, solvents, paints, degreasers, corrosives, heavy metals, reactives, thinners, ignitables
Industrial/Business Park Commercial Hotel	Office complexes, light industry, research and development, training facility, high tech warehousing and manufacturing, general manufacturing, resort/conference facilities, hotels, golf courses, recreational, open space.	Fuels, solvents, corrosives, ignitables, heating oils, heavy metals, catalysts, aerosols
Commercial	Hotel, office complexes, light industry, research and development	Heating oils, pesticides, fungicides, herbicides, fuels, solvents, corrosives, ignitables, plating wastes, cyanides, laboratory wastes

Hazardous Waste Management. The four proposed land use zones (see Table 4.3-3) would host many operations that are yet to be defined.

Once the responsibilities of hazardous waste management are allocated to individual organizations, proficiency with those materials and spill responses is required by OSHA regulations (29 CFR). Mutual aid agreements with surrounding communities may require additional scrutiny and training of emergency staff.

The presence of numerous independent owner/operators on the base would change the regulatory requirements and probably increase the regulatory burden relative to hazardous waste management. Activities associated with the International Airport Alternative would lead to an increase in the amount of hazardous waste generated compared to the closure baseline.

Installation Restoration Program Sites. The IRP program and remediation requirements could delay or limit proposed land uses under the International Airport Alternative. IRP sites and their associated land use under this alternative are listed in Table 4.3-4.

- **Airfield** - Flightline operations associated with the International Airport Alternative may be impacted due to the overall airport expansion (extension and expansion of runways, taxiways and aprons) into areas at additional IRP sites. This expansion would extend into the Northeast Disposal Area, which contains TCE groundwater contamination, as well as numerous burial sites and landfills that will not be cleaned up prior to base closure. Remediation facilities for the TCE contamination plume are in place and may delay construction of runways or cause them to

Table 4.3-4. IRP Sites within Land Use Areas - International Airport Alternative

Proposed Land Use	IRP Sites
Airfield	TCE Groundwater Plume, Liquid Fuel Distribution System (ST-67), Industrial Storm Drain (SD-25) DP-01, DP-03, DP-04, DP-47, DP-60, FT-19, FT-19a, LF-13, LF-35, LF-36, LF-37, LF-38, LF-43, LF-45, OT-48, OT-51, SD-18, SD-27, SD-28, SD-41, SS-21, SS-23, SS-24, SS-30, SS-58, SS-59, ST-54, ST-56, ST-57, WP-11, WP-32
Aviation Support	Industrial Storm Drain (SD-25), DP-02, DP-04, DP-46, FT-20, LF-14, LF-44, SS-53, SS-55, WP-26, WP-29
Industrial	DP-10, DP-15, DP-33, DP-34, LF-07, LF-08, LF-11, LF-12, LF-39, RW-09, SS-52, SS-55, WP-16, WP-40
Commercial	LF-39, OT-22
Vacant Land	SD-42

be realigned. Monitoring well locations could delay or limit base reuse under this alternative.

Expansion along the existing flightline may be impacted by cleanup and monitoring activities associated with the Liquid Fuel Distribution System (site ST-67). Runway extension to the southwest would advance into spill sites and landfills in the West Perimeter Disposal Area, with potential impact to airfield operations. Cleanup and monitoring activities associated with the JP-4 leak, site SS-30, may delay or restrict airfield expansion in the Central Disposal Area.

- **Aviation Support** - Aviation support development may be affected based on its proximity to the base landfill (site LF-14) and remediation and monitoring activities associated with this IRP site.
- **Industrial** - Industrial development may be impacted by cleanup activities associated with landfills and burial sites in the Southeast Disposal Area. Installation of monitoring wells may restrict use in this area. Cleanup efforts are discussed in Section 4.3.1.
- **Commercial** - This land use area is underlain by IRP sites LF-39 and OT-22.
- **Vacant Land** - IRP site SD-42 should not impact base reuse under this alternative.

Underground/Aboveground Storage Tanks. Air flight and maintenance operations associated with the International Airport Alternative would require the use of aboveground storage tanks and USTs. These tanks must be in compliance with federal, state and local regulations regarding leaks, spills and overfill protection and liability insurance.

Asbestos. Renovation and demolition of existing structures with ACM may occur with reuse development. Such activities will comply with all applicable federal, state and local regulations. The number of structures with ACM is unknown; an asbestos survey is currently in progress.

Pesticides and Herbicides. Under the International Airport Alternative pesticide and herbicide usage would continue as currently practiced. An increase in usage for airfield maintenance would counterbalance the elimination of pesticides and herbicides used at the golf course.

PCBs. All federally regulated PCB-contaminated equipment (50 to 499 ppm) will be removed prior to base closure; therefore, these materials will not create any impacts. PCB items (5 to 49 ppm) remaining after base closure will be managed in compliance with state regulations.

Radon. All radon screening survey results were below the EPA's recommended mitigation level of 4 pCi/l of air; therefore, no action is required and radon will have no impact on reuse activities.

Medical/Biohazardous Waste. All of these materials will be incinerated and removed prior to base closure. Accordingly, these materials will not present any impact.

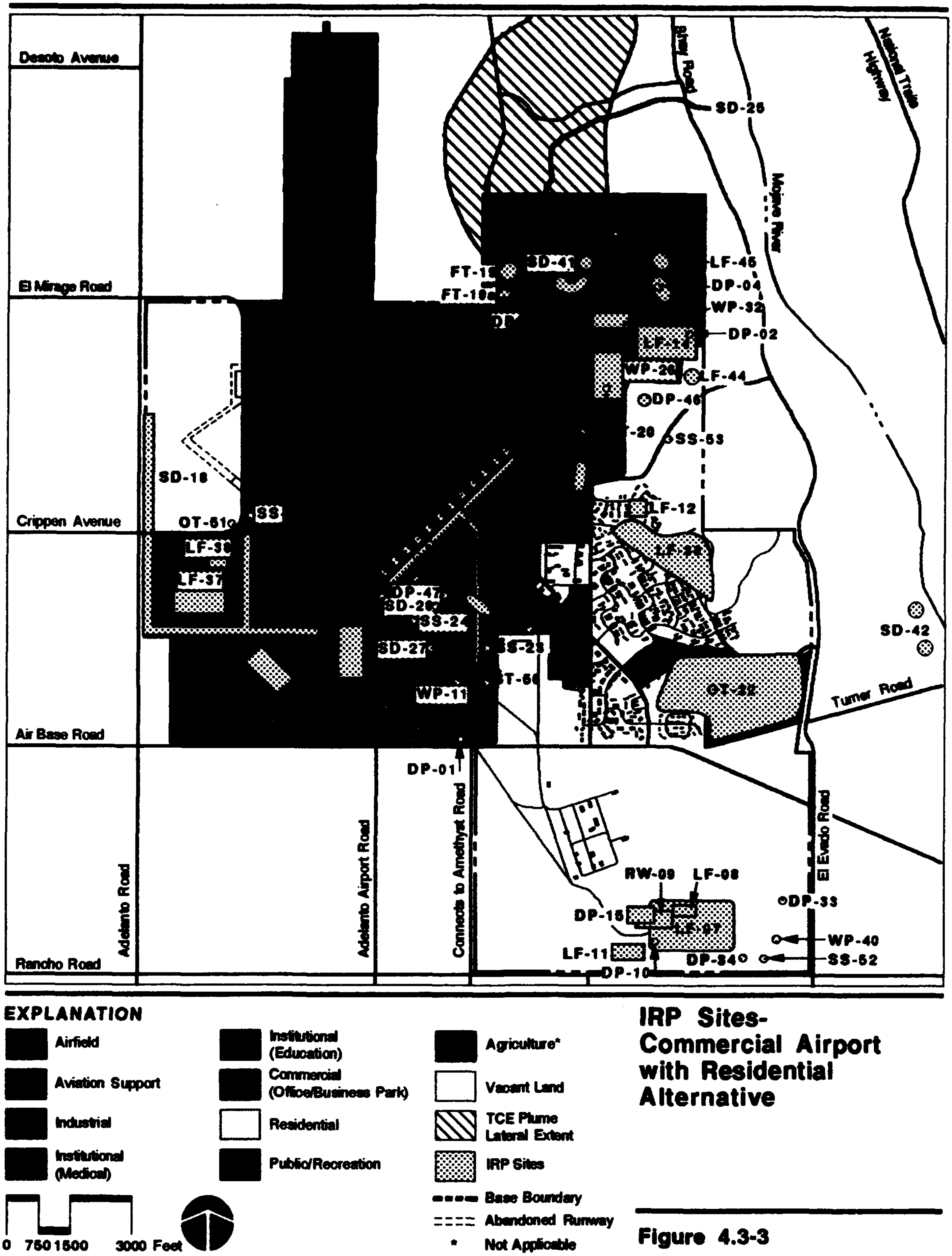
Cumulative Impacts. No cumulative impacts would result under the International Airport Alternative.

Mitigation Measures. The same mitigation measures applicable to the Proposed Action would be appropriate for activities associated with the International Airport Alternative. In addition, realignment of the runway or relocation of TCE remediation facilities and monitoring wells in the Northeast Disposal Area may be required in order to eliminate reuse delays.

4.3.3 Commercial Airport with Residential Alternative

Hazardous Materials Management. The Commercial Airport with Residential Alternative differs from the Proposed Action in that it includes residential and institutional land uses (Figure 4.3-3). The usage of pesticides and herbicides would increase in comparison to the Proposed Action. The hazardous materials that would be utilized for operations of the Commercial Airport with Residential Alternative are summarized in Table 4.3-5. The amounts of hazardous materials used and hazardous waste generated would be approximately equivalent to those under the Proposed Action.

Currently, handling of hazardous materials on the base is managed by DOD. If the Commercial Airport with Residential Alternative were implemented, each separate organization within the commercial airport structure would be responsible for the management of hazardous materials according to applicable regulations. Additionally, each organization would have to comply with SARA, Section 311, Title III, which requires that local communities be informed of the use of hazardous materials.



IRP Sites-Commercial Airport with Residential Alternative

Figure 4.3-3

Table 4.3-5. Hazardous Material Usage - Commercial Airport with Residential Alternative

Land Use Zones	Operation Process	Hazardous Materials
Airfield	Refueling; anti-/de-icing; utilization of clear zones, runways, taxiways, airport terminal, parking, administration offices, corporate and private aviation facilities, aircraft parking, fixed-based operators	Aviation fuels, propylene glycol, ethylene glycol, heating oils
Aviation Support	Operations associated with aircraft maintenance, aircraft manufacturing, aeronautics research and development, air transportation-related industry and warehousing, law enforcement, airline maintenance, other government agencies	Fuels, solvents, paints, degreasers, corrosives, heavy metals, reactives, thinners, ignitables, plating wastes, cyanides and laboratory wastes
Industrial	Operations associated with light industry, research/development, warehousing	Solvents, heavy metals, corrosives, catalysts, fuels, heating oils, aerosols
Institutional (Medical)	Operation of existing hospital	Medical/biohazardous waste, heavy metals, chemotherapeutic and radiological sources, laboratory wastes, solvents
Institutional (Education)	Operation of aviation-related training, and public education (existing schools)	Corrosives, reactives, solvents, fuels, ignitables, paints, heating oils
Commercial	Operation of restaurants, banks	Pesticides, herbicides, fungicides, chlorine, fuels, heating oils
Residential	Activities associated with single family, multi-family units	Heating oils, solvents, pesticides, herbicides, chlorine
Public/Recreation	Maintenance of existing recreational facilities and golf course	Pesticides, fungicides, herbicides, heating oils, chlorine
Vacant Land	Vacant	Pesticides, fungicides, herbicides

Hazardous Waste Management. The nine proposed land use zones (see Table 4.3-5) would host many operations that are yet to be defined.

Once the responsibilities of hazardous waste management are allocated to individual organizations, proficiency with those materials and spill responses is required by OSHA regulations (29 CFR). Mutual aid agreements with surrounding communities may require additional scrutiny and training of emergency staff.

The presence of numerous independent owner/operators on the base would change the regulatory requirements and probably increase the regulatory burden relative to hazardous waste management. Activities associated with the

Commercial Airport with Residential Alternative would lead to an increase in the amount of hazardous waste generated compared to the closure baseline.

Installation Restoration Program Sites. Impacts to the commercial airport with residential alternative due to IRP activities are discussed below. Table 4.3-6 contains a listing of IRP sites associated with each land use.

Table 4.3-6. IRP Sites within Land Use Areas - Commercial Airport with Residential Alternative

Proposed Land Use	IRP Sites
Airfield	TCE Groundwater Plume Industrial Storm Drain (SD-25), DP-03, DP-04, DP-60, LF-13, LF-35, LF-36, LF-43, LF-45, SD-18, SD-41, WP-32
Aviation Support	Liquid Fuel Distribution System (ST-67) Industrial Storm Drain (SD-25) DP-02, LF-14, SS-30, SS-55, ST-54, ST-56, ST-57, WP-29, WP-32
Industrial	TCE Groundwater Plume Industrial Storm Drain (SD-25), DP-01, DP-47, FT-19, FT-19a, FT-20, LF-14, LF-37, LF-38, OT-48, SD-18, SD-27, SD-28, SS-21, SS-23, SS-24, SS-59, ST-56, WP-11, WP-26
Institutional (Medical)	None
Institutional (Education)	OT-48, WP-16
Commercial	None
Residential	DP-10, DP-15, DP-33, DP-34, DP-46, LF-07, LF-08, LF-11, LF-12, LF-39, LF-44, OT-22, OT-51, RW-09, SD-18, SS-52, SS-53, WP-40
Public/Recreation	OT-22
Vacant Land	SD-42

- **Airfield** - Flight operations for the proposed commercial airport may be disrupted by cleanup activities associated with the Liquid Fuel Distribution System (site ST-67). Ongoing cleanup of the TCE groundwater plume in the northeastern portion of the proposed airfield may not create additional impacts to this land use.
- **Aviation Support** - Development associated with this proposed land use may be impacted by cleanup activities associated with base landfill LF-14. Cleanup of the Liquid Fuel Distribution System, as well as numerous other IRP sites within the Central Disposal Area, may delay development of flightline and other facilities within the Central Base Area.
- **Industrial** - Development within the northeast Disposal Area may be delayed due to cleanup activities associated with the TCE groundwater plume. Cleanup of numerous other sites in the west perimeter and Central Disposal Areas may delay construction associated with this proposed land use.
- **Institutional (Medical)** - No IRP sites are associated with this proposed land use under the alternative.

- **Institutional (Education)** - Development associated with this proposed land use may be delayed due to cleanup of a POL leach field (site WP-16) and the base salvage yard (site OT-48).
- **Commercial** - No IRP sites are associated with this proposed land use under this alternative.
- **Residential** - Cleanup activities associated with numerous landfills, burial sites, and spill sites in the western, eastern, and southeastern sections of George AFB may delay construction of proposed residential land uses.
- **Vacant Land** - IRP site SD-42 should not impact the base reuse under this alternative.

Underground/Aboveground Storage Tanks. Air flight and maintenance operations associated with the Commercial Airport with Residential Alternative would require the use of aboveground storage tanks and USTs. These tanks must be in compliance with federal, state and local regulations regarding leak, spill, and overfill protection and liability insurance.

Asbestos. Renovation and demolition of existing structures with ACM may occur with reuse development. Such activities will comply with all applicable federal, state and local regulations. The number of structures with ACM is unknown; an asbestos survey is currently in progress.

Pesticides and Herbicides. Usage of pesticides and herbicides for the Commercial Airport with Residential Alternative would increase over current amounts as a result of the increase in residential development.

PCBs. All federally regulated PCB-contaminated equipment (50 to 499 ppm) will be removed prior to base closure; therefore, these materials will not create any impacts. PCB items (5 to 49 ppm) remaining after base closure will be managed in compliance with state regulations.

Radon. All radon screening survey results were below EPA's recommended mitigation level of 4 pCi/l of air; therefore, no action is required and radon will have no impact on reuse activities.

Medical/Biohazardous Waste. The hospital would generate medical/biohazardous waste; management practices would conform to Title 22, Article 13 of the CCR.

Cumulative Impacts. No cumulative impacts would result under the Commercial Airport with Residential Alternative.

Mitigation Measures. The same mitigation measures discussed for the Proposed Action would be appropriate for activities associated with this alternative. Reuse of residential areas may carry restrictions based on remediation and closure operations performed at specific sites. Reuse as a park, greenbelt or open space are options available to developers.

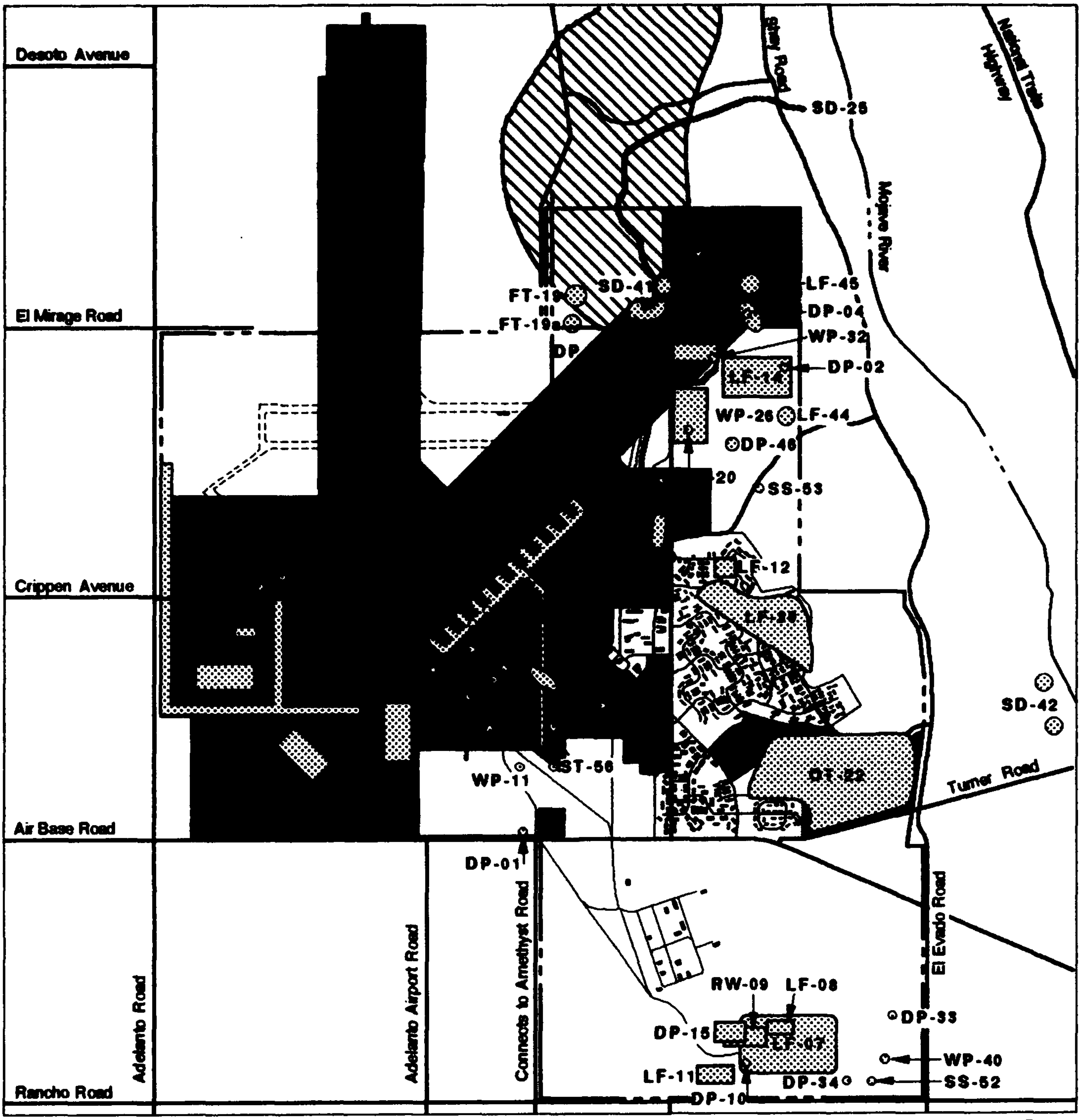
4.3.4 General Aviation Center Alternative

Hazardous Materials Management. The Proposed Action and the General Aviation Center Alternative differ in the reduced number and types of operations and the retention of residential areas. Approximately 50 percent of the base has not been identified for development (inactive) in this alternative (Figure 4.3-4), whereas the Proposed Action utilizes the entire base. The effects concerning IRP, USTs, asbestos, and pesticides and herbicides would be similar to those identified for the Proposed Action. Smaller quantities of hazardous materials and wastes would be present under this alternative because of the reduction in aircraft operations and the absence of any proposed industrial reuse (Table 4.3-7).

Table 4.3-7. Hazardous Material Usage - General Aviation Center Alternative

Land Use Zones	Operation Process	Hazardous Materials
Airfield	Refueling; anti-/de-icing; utilization of clear zones, taxiways, airport terminal parking, administrative offices, corporate and private aviation facilities, aircraft parking, fixed base operators	Aviation fuels, propylene glycol, ethylene glycol, heating oils
Aviation Support	Operations associated with general aviation use, aircraft maintenance	Fuels, solvents, paints, degreasers, corrosives, heavy metals, reactives, thinners, ignitables, plating wastes, cyanides, laboratory wastes
Institutional (Education)	Operation of schools	Solvents, fuels, ignitables, paints, heating oils
Institutional (Medical)	Operation of existing hospital	Medical/biohazardous waste, heavy metals, chemotherapeutic and radiological sources, laboratory waste, solvents
Commercial	Operation of existing land exchange offices, banks and restaurant establishments	Heating oils, solvents, fungicides, herbicides, pesticides
Residential	Activities associated with single family and multi-family units	Heating oil, fuels, solvents, herbicides, pesticides, chlorine
Public/Recreation	Maintenance of existing recreational facilities and vacant areas, golf course	Pesticides, fungicides, herbicides, chlorine, heating oils
Vacant Land	Vacant	Pesticides, fungicides, herbicides

Currently, handling of hazardous materials on the base is managed by DOD. If the General Aviation Center Alternative were implemented, each separate organization within the commercial airport structure would be responsible for the management of hazardous materials according to applicable regulations. Additionally, each organization would have to comply with SARA, Section 311,



EXPLANATION

- Airfield
- Aviation Support
- Industrial*
- Institutional (Medical)
- Institutional (Education)
- Commercial (Office/Business Park)
- Residential
- Public/Recreation
- Agriculture*
- Vacant Land
- TCE Plume Lateral Extent
- IRP Sites
- Base Boundary
- Abandoned Runway
- * Not Applicable

0 750 1500 3000 Feet

IRP Sites- General Aviation Center Alternative

Figure 4.3-4

Title III, which requires that local communities be informed of the use of hazardous materials.

Hazardous Waste Management. The eight proposed land use zones (see Table 4.3-7) would host many operations that are yet to be defined. This section describes the types of hazardous wastes that may be generated in these land use zones.

Once the responsibilities of hazardous waste management are allocated to individual organizations, proficiency with those materials and spill responses is required by OSHA regulations (29 CFR). Mutual aid agreements with surrounding communities may require additional scrutiny and training of emergency staff.

The presence of numerous independent owner/operators on the base would change the regulatory requirements and probably increase the regulatory burden relative to hazardous waste management. Activities associated with the General Aviation Center Alternative would lead to an increase in the amount of hazardous waste generated compared to the closure baseline.

Installation Restoration Program Sites. The IRP remediation requirements may delay or limit the proposed land uses identified under the General Aviation Center Alternative. Table 4.3-8 lists the IRP sites and their respective land uses under this alternative.

Table 4.3-8. IRP Sites within Land Use Areas - General Aviation Center Alternative

Proposed Land Use	IRP Sites
Airfield	TCE Groundwater Plume, Liquid Fuel Distribution System (ST-67), Industrial Storm Drain (SD-25), DP-03, DP-04, DP-60, LF-13, LF-35, LF-36, LF-43, LF-45, SD-18, SD-41, ST-54, WP-32
Aviation Support	Liquid Fuel Distribution System (ST-67), Industrial Storm Drain (SD-25), DP-47, LF-37, LF-38, OT-48, OT-51, SD-18, SD-27, SD-28, SS-21, SS-23, SS-24, SS-30, SS-58, SS-59, ST-56, ST-57
Institutional (Medical)	None
Institutional (Education)	None
Commercial	Liquid Fuel Distribution System (ST-67), Industrial Storm Drain (SD-25), DP-47, OT-48, SS-55, WP-16, WP-29
Residential	LF-12, LF-39
Public/Recreation	OT-22
Vacant Land	TCE Groundwater Plume, Industrial Storm Drain (SD-25), DP-01, DP-02, DP-10, DP-15, DP-33, DP-34, DP-46, FT-19, FT-19a, FT-20, LF-07, LF-08, LF-11, LF-14, LF-44, RW-09, SD-42, SS-52, SS-53, ST-56, WP-11, WP-26, WP-40

- **Airfield** - IRP cleanup activities of the base landfill would not impact airfield operations at the northeast end of the runway. Cleanup and monitoring

well activities for the Liquid Fuel Distribution System (site ST-67) may impact flightline operation.

- **Aviation Support** - Development of proposed aviation support areas may be impacted by cleanup actions within the Central Disposal Area and the Liquid Fuel Distribution System.
- **Commercial** - The proposed commercial land uses are not expected to be impacted by any cleanup activities. Cleanup efforts are discussed in Section 4.3.1.
- **Institutional (Education)** - No IRP sites are associated with this proposed land use under this alternative.
- **Institutional (Medical)** - No IRP sites are associated with this proposed land use under this alternative.
- **Public/Recreation** - Reuse of this area should not be affected by IRP site OT-22.
- **Residential** - Proposed residential areas overlay landfills (see Figure 4.3-4) under this alternative and may have to incorporate greenbelt, open space, or parks into residential areas to accommodate remediation and monitoring efforts.
- **Vacant land** - The entire Southeast Disposal Area and most of the IRP sites assigned to the northeast disposal area, including the TCE groundwater plume, are on vacant land and should not delay or restrict development under this alternative.

Underground/Aboveground Storage Tanks. Air flight and maintenance operations associated with the General Aviation Center Alternative would require the use of aboveground storage tanks and USTs. These tanks must be in compliance with federal, state and local regulations regarding leak, spill, and overfill protection, and liability insurance.

Asbestos. Renovation and demolition of existing structures with ACM may occur with reuse development. Such activities will comply with all applicable federal, state and local regulations. The number of structures with ACM is unknown; an asbestos survey is currently in progress.

Pesticides and Herbicides. Under the General Aviation Center Alternative, pesticide and herbicide usage would continue as currently practiced.

PCBs. All federally regulated PCB-contaminated equipment (50 to 499 ppm) will be removed prior to base closure; therefore, these materials will not create any impacts. PCB items (5 to 49 ppm) remaining after base closure will be managed in compliance with state regulations.

Radon. All radon screening survey results were below EPA's recommended mitigation level of 4 pCi/l of air; therefore, no action is required and radon will have no impact on reuse activities.

Medical/Biohazardous Waste. The hospital would generate medical/biohazardous waste; management practices would conform to Title 22, Article 13 of the CCR.

Cumulative Impacts. No cumulative impacts would result under the General Aviation Center Alternative.

Mitigation Measures. The same mitigation measures discussed for the Proposed Action would be appropriate for activities associated with this alternative.

4.3.5 Non-Aviation Alternative

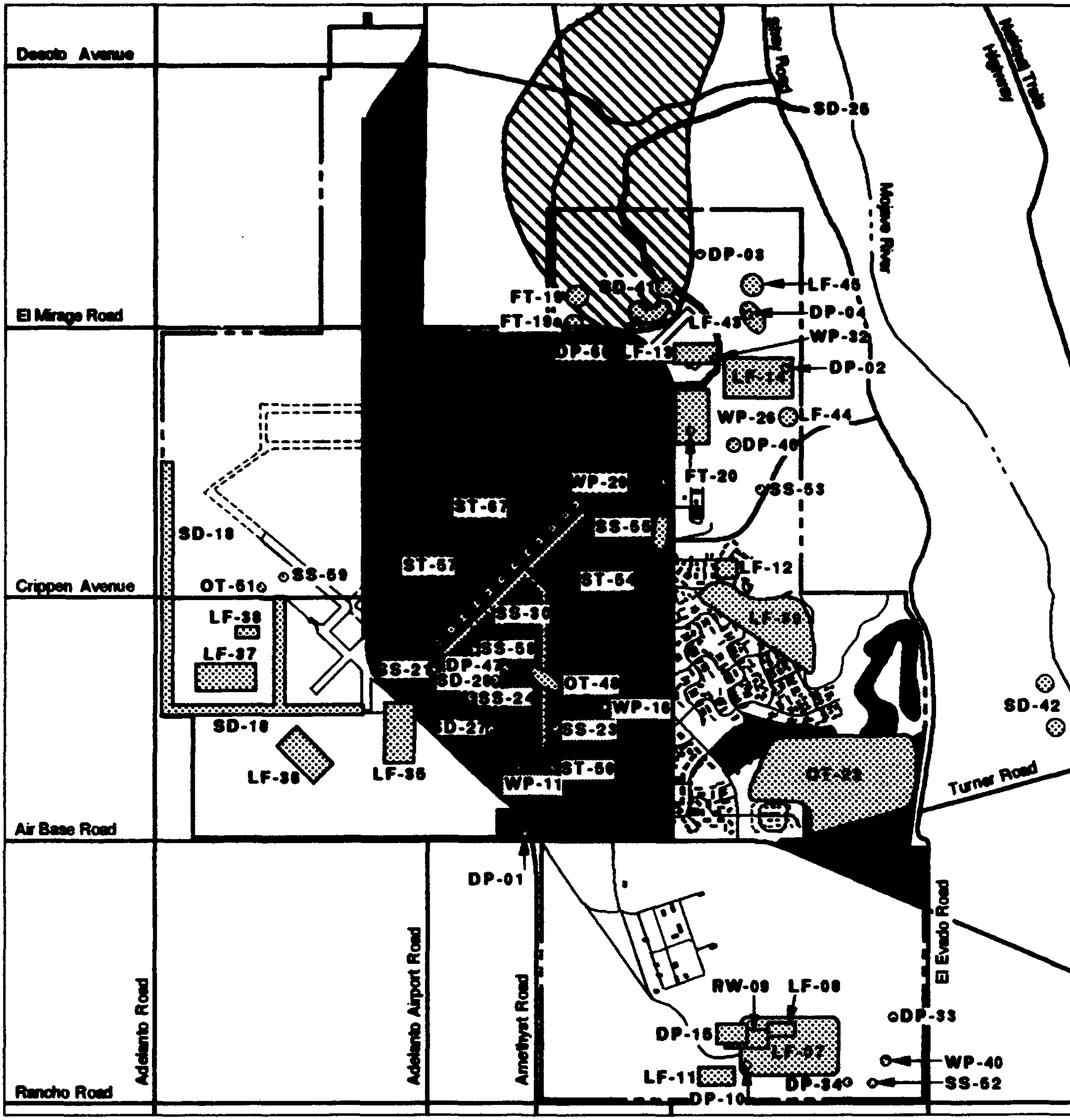
Hazardous Materials Management. Effects associated with the implementation of the Non-Aviation Alternative (Figure 4.3-5) would be similar to those identified for the Proposed Action. Because there would be no aviation or associated maintenance activities under this option, the amounts of hazardous materials managed would be less than those used under the Proposed Action. The proposed industrial activities associated with this alternative, however, might offset that reduction. The hazardous materials that would be used under the Non-Aviation Alternative are summarized in Table 4.3-9.

Table 4.3-9. Hazardous Material Usage - Non-Aviation Alternative

Land Use Zones	Operation Process	Hazardous Materials
Industrial	Activities associated with light industry, research and development, warehousing	Fuels, solvents, corrosives, ignitables, heating oils, heavy metals, catalysts, heating oils, plating wastes, cyanides, laboratory wastes, shipping of hazardous materials
Institutional (Medical/Education)	Operation of existing schools and higher education, hospital	Medical/biohazardous waste, heavy metals, chemotherapeutic and radiological sources, laboratory waste, solvents
Commercial	Operation of retail/offices	Fuels, solvents, corrosives, ignitables, heating oils, pesticides, herbicides, fungicides
Residential	Activities associated with single family and multi family units	Heating oils, solvents, pesticides, herbicides, fungicides, chlorine
Public/Recreation	Maintenance of existing recreational facilities/golf course	Pesticides, herbicides, fungicides, chlorine
Vacant Land	Vacant	Pesticides, herbicides, fungicides

Hazardous Waste Management. The same effects discussed under the Proposed Action would apply with implementation of this alternative. Industrial activities may generate similar types of hazardous waste to those of aviation maintenance activities, but in smaller quantities. Various parties would be responsible for managing different waste streams in the identified reuse areas.

Installation Restoration Program Sites. The IRP program and remediation requirements may impact the land uses identified in this Non-Aviation Alternative (Figure 4.3-5). IRP sites and their proposed land use under this alternative are presented in Table 4.3-10.



EXPLANATION

Airfield*	Institutional (Education)
Aviation Support*	Commercial (Office/Business Park)
Industrial	Residential
Institutional (Medical)	Public/Recreation
Agriculture*	Vacant Land
TCE Plume Lateral Extent	IRP Sites

Base Boundary
Abandoned Runway
* Not Applicable

0 750 1500 3000 Feet

**IRP Sites-
Non-Aviation
Alternative**

Figure 4.3-5

Table 4.3-10. IRP Sites within Land Use Areas - Non-Aviation Alternative

Proposed Land Use	IRP Sites
Industrial	Liquid Fuel Distribution System (ST-67), Industrial Storm Drain (SD-25), SD-27, SD-28, SS-21, SS-24, SS-30, SS-55, SS-58, ST-54, ST-57, WP-29
Institutional (Medical)	None
Institutional (Education)	Liquid Fuel Distribution System (ST-67), DP-47, OT-48, SS-23, SS-55, ST-56, WP-11, WP-16
Commercial	DP-01
Residential	TCE Groundwater Plume, Industrial Storm Drain (SD-25), DP-02, DP-03, DP-04, DP-10, DP-15, DP-33, DP-34, DP-48, DP-60, FT-19, FT-19a, FT-20, LF-07, LF-08, LF-11, LF-12, LF-13, LF-14, LF-35, LF-36, LF-37, LF-38, LF-39, LF-43, LF-44, LF-45, OT-22, OT-51, RW-09, SD-18, SD-41, SS-52, SS-53, SS-59, WP-28, WP-32, WP-40
Public/Recreation	OT-22
Vacant Land	SD-42

- **Industrial** - Proposed industrial areas associated with this alternative may be impacted by cleanup activities within the central Disposal Area, and would include cleanup of the Liquid Fuel Distribution System (site ST-67)
- **Institutional (Medical)** - No IRP sites are associated with this proposed land use under this alternative.
- **Institutional (Education)** - Development of proposed educational facilities may be implemented by cleanup activities associated with the Liquid Fuel Distribution System as well as numerous other IRP sites within the Central Disposal Area.
- **Commercial** - This area proposed for commercial development may be impacted by cleanup activities associated with a paint drum burial site (site DP-01).
- **Residential** - Areas associated with the Non-Aviation Alternative overlie numerous landfills, burial sites and fuel spill areas located within the Southeast and Northeast Disposal Areas. The presence of these IRP sites within the residential areas may limit the site-specific reuse plans on locating residential units on or near these IRP sites, depending on the severity of contamination and level of IRP effort to remediate any contamination. Reuse as open space, greenbelts, or parks may represent suitable reuse options. Cleanup and monitoring activities at these sites could delay development of the proposed residential reuses. Cleanup activities for proposed residential areas within the West Perimeter and Central Disposal Areas may also impact development.
- **Public/Recreation** - Reuse of this area should not be effected by IRP site OT-22.

Underground/Aboveground Storage Tanks. Maintenance operations associated with the Non-Aviation Alternative would require the use of aboveground storage tanks and USTs. These tanks must be in compliance with federal, state and local regulations regarding leak, spill and overfill protection and liability insurance.

Asbestos. Renovation and demolition of existing structures with ACM may occur with reuse development. Such activities will comply with all applicable federal, state and local regulations. The number of structures with ACM is unknown; an asbestos survey is currently in progress.

Pesticides and Herbicides. Pesticides and herbicides usage associated with the Non-Aviation Alternative may increase in several land use areas from quantities currently used. Management practices would conform to FIFRA and state regulations.

PCBs. All federally regulated PCB-contaminated equipment (50 to 499 ppm) will be removed prior to base closure; therefore, these materials will not create any impacts. PCB items (5 to 49 ppm) remaining after base closure will be managed in compliance with state regulations.

Radon. All radon screening survey results were below EPA's recommended mitigation level of 4 pCi/l of air; therefore, no action is required and radon would not create any impact on reuse activities.

Medical/Biohazardous Waste. The hospital would generate medical/ biohazardous waste; management practices would conform to Title 22, Article 13 of the CCR.

Cumulative Impacts. No cumulative impacts would result under the Non-Aviation Alternative.

Mitigation Measures. The same mitigation measures discussed for the Commercial Airport with Residential Alternative would be appropriate for activities associated with this alternative.

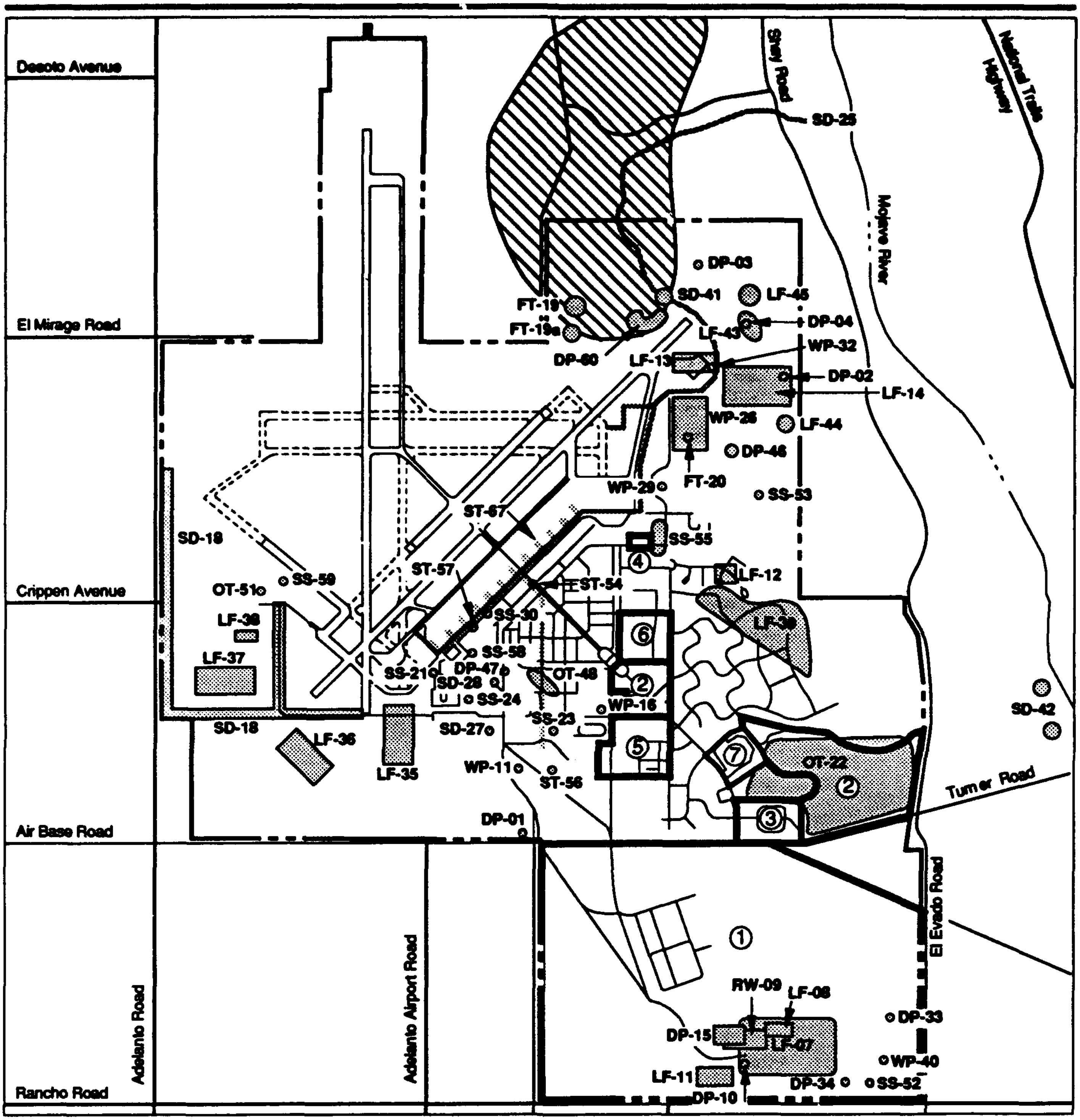
4.3.6 Other Land Use Concepts

This section will discuss transfers/conveyances within the framework of the IRP and within the context of the hazardous materials typically associated with their proposed reuses (Figure 4.3-6). IRP sites associated with each land use concept are provided in Table 4.3-11.

U.S. Department of Justice. The hazardous materials likely to be utilized and the associated waste generated for an FCC would include fuels, ignitables, solvents corrosives, heating oils, dry cleaning solvents, pesticides and herbicides. Cleanup activities at numerous landfills and munitions burial sites within the Southeast Disposal Area may restrict development of the proposed FCC.

U.S. Department of the Interior. No change in function or use is proposed by the DOI transfer, and there would be no impacts due to IRP remediation activities.

U.S. Department of Housing and Urban Development. No change in function or use is proposed. These units may have ACM, and removal would, if required,



EXPLANATION

① Federal Correctional Complex

② Recreation Facilities

③ Alaska Circle

④ Boron Airway Facility Sector Field Office Parking Garage

⑤ Adelanto School District

⑥ San Bernardino County Work Furlough Dormitories

⑦ Private Medical Institution

IRP Site

TCE Plume Lateral Extent

---- Base Boundary

==== Abandoned Runway

0 750 1500 3000 Feet

IRP Sites- Federal Transfers and Independent Land Uses

Figure 4.3-6

Table 4.3-11. IRP Sites within Land Use Areas - Other Land Use Concepts

Proposed Land Use	IRP Sites
Federal Correctional Complex	DP-10, DP-15, DP-33, DP-34, LF-07, LF-08, LF-11, RW-09, SS-52, WP-40
Recreation Facilities	OT-22
Alaska Circle	None
Boron Airway Facility Sector Field Office Parking Garage	None
Adelanto School District	None
San Bernardino County Work Furlough Dormitories	None
Private Medical Institution	None

temporarily impact reuse. No impacts would occur due to IRP remediation activities.

U.S. Department of Transportation. No change in function or use is proposed and hazardous materials used and wastes generated will not change; therefore, there is no impact. IRP remediation activities would not cause any impacts.

U.S. Department of Education. The hazardous materials likely to be utilized and associated wastes generated for the reuse as a school, would likely include fuels, ignitables, solvents, corrosives, heating oils, paints, degreasers, heavy metals, reactives, thinners, and laboratory wastes. Reuse of existing buildings must comply with AHERA regulations. These facilities may contain ACM, and removal of these materials may delay reuse of these facilities. No impacts would occur from IRP remediation activities.

San Bernardino County Work Furlough Program. No change in function or use is proposed, therefore, there would be no impact. Additionally, no impacts from any IRP activities would be incurred.

Medical Facilities. The hospital would generate medical/biohazardous waste; management practices would conform to Title 22, Article 13 of the CCR. IRP remediation activities may not impact reuse.

4.3.7 No-Action Alternative

The only hazardous materials/waste issues associated with this alternative would concern the final phases of the IRP activities. The No-Action Alternative would require the DMT to manage all waste generated under the applicable regulations. Painting and maintenance would be the primary activities that would involve hazardous materials.

Hazardous Materials Management. Hazardous materials would be utilized in preventive and regular maintenance activities, grounds maintenance, and water treatment. The materials used for these activities would include pesticides, herbicides, fuels, paints and corrosives. The DMT would be responsible for hazardous materials handling training, as well as hazardous materials communication requirements of OSHA regulations.

Hazardous Waste Management. With the exception of facilities utilized by DMT personnel, all satellite accumulation points would be closed before base closure. DRMO would dispose of all hazardous waste prior to closure. The small amount of hazardous waste that would be generated under the No-Action Alternative may enable the DMT to become an exempt, small-quantity generator.

Installation Restoration Program Sites. The DMT would support the utility requirements for the IRP contractor and provide security for the areas. Ongoing sampling and pump-and-treat remedial design activities would be continued by the individual IRP contractors.

Underground/Aboveground Storage Tanks. The three USTs designed in compliance with 1988 requirements, located at the AGE Service Station (Fac 789) will be closed in place. Plans to remove all USTs would be implemented after closure.

The aboveground storage tanks would be purged to avoid fire hazards. The DMT would provide cathodic protection, repair, and maintenance of the aboveground storage tanks and piping.

Asbestos. The impacts from the No-Action Alternative would be minimal. Vacated facilities would likely be boarded up if the No-Action Alternative were implemented. All deteriorated asbestos materials will be abated; therefore, ACM would not be released into the atmosphere.

Pesticides and Herbicides. Under the No-Action Alternative, the grounds and golf course would be maintained in such a manner as to facilitate economic resumption of use. There should not be an appreciable increase in the use of pesticides and herbicides. Application of pesticides and herbicides would be conducted in accordance with FIFRA and state regulations to assure the proper and safe handling and application of all chemicals.

PCBs. All federally regulated PCB-contaminated equipment (50 to 499 ppm) will be removed prior to base closure; therefore, these materials will not create any impacts. PCB items (5 to 49 ppm) remaining after base closure will be managed in compliance with state regulations.

Radon. All radon screening survey results were below EPA's recommended mitigation level of 4 pCi/l of air; therefore, no further action is required and radon would not create any impacts.

Medical/Biohazardous Waste. All of these materials will be disinfected or removed prior to closure; therefore, these materials will not create an impact.

Cumulative Impacts. No cumulative impacts would result under the No-Action Alternative.

Mitigation Measures. Under the No-Action Alternative, one organization would be responsible for the basewide management of hazardous materials/waste. Contingency plans to address spill response would be less extensive than those required for the Proposed Action or the other reuse alternatives.

4.4 NATURAL ENVIRONMENT

This section describes the potential effects on the natural resources of soils and geology, water resources, noise, biological resources, and cultural resources in the base area and the surrounding region.

4.4.1 Soils and Geology

This section describes the potential effects of the Proposed Action and reuse alternatives on the local soils and geology. The analysis is based on the review of published literature. Soils and geology will be affected largely during the construction phase, when local soil profiles are altered and regional aggregate supplies are tapped. After construction, soils will remain relatively stable because they will be overlain by facilities or pavements or managed in such a way that erosion will be minimized.

4.4.1.1 Proposed Action. Regional effects on soils and geology would not be significant. Use of sand and gravel resources (e.g., for base or drain construction material) from several large producers adjacent to the Mojave River, where these resources are plentiful, would not significantly reduce the availability of these materials.

Local effects on soils and geology would result primarily from the construction activities associated with the Proposed Action, such as grading, excavating, and recontouring the soils. These activities could alter soil profiles and the local topography.

Local soils are highly susceptible to wind erosion and slightly to moderately susceptible to water erosion; therefore, preventative measures would be necessary to minimize erosion. During construction, removal of vegetative cover and disturbance of desert pavement by the exposure of cut slopes and grading activities would increase the potential for erosion by wind and water. Most of the on-base areas affected by construction activity have been previously developed. Renovation of existing facilities could create some impacts. Off-base land subject to acquisition northeast and south of the north-south runway would be affected most by construction-related activities.

Alteration of natural surface and soil conditions will occur as a result of grading, trenching, and vehicular traffic across undeveloped land surfaces. These activities will cause degradation of naturally occurring desert pavement and short-term exposure of underlying soils, all of which will create adverse conditions related to soil erosion by wind and water.

Over 2,600 acres of land will be disturbed under this alternative including a total of approximately 200 acres of off-base land. Soils in the various land use areas, with the exception of recreational/open space areas, would be affected by construction operations. Construction-related activity associated with renovation and extension of the existing airfield will affect large areas both on and off base (about 169 acres). Construction-related activity in the aviation support areas could potentially disturb approximately 523 acres near the runway. Renovation, demolition, and construction in the industrial, business, and commercial areas will affect approximately 1,934 acres, but will be concentrated in areas already developed by base-related activities. Approximately 300 acres of existing recreational/open space land will not be developed and no adverse effects on local soil conditions are expected.

Table 4.4-1 identifies the approximate acreages to be disturbed under this alternative in each of the three phases (1993-1998, 1998-2003, and 2003-2013) after base closure. Total off-base land to be disturbed is less than 10 percent of the off-base area to be acquired (202 acres of the 2,352 acres to be acquired) for this alternative.

Table 4.4-1. Estimated Acreage to be Disturbed at 5, 10, and 20 Year Intervals - Proposed Action

	1993 - 1998		1998 - 2003		2003 - 2013		Total		
Land Use	On-Base	Off-Base	On-Base	Off-Base	On-Base	Off-Base	On-Base	Off-Base	Total
Airfield	68	-	-	-	-	101	68	101	169
Aviation Support	130	-	155	-	238	-	523	-	523
Commercial									
Office/ BusinessPark	135	-	135	-	281	-	551	-	551
Industrial									
Aviation-Related	154	-	140	-	301	-	595	-	595
Business Park	-	101	357	-	330	-	687	101	788
Recreation	15	-	-	-	-	-	15	-	15
Totals	502	101	787	-	1,150	101	2,439	202	2,641

Some existing facilities may not meet current Uniform Building Code (UBC) design standards for Seismic Hazard Zone 4. The conforming guidelines followed by the high desert region of San Bernardino County do not go beyond those of the UBC. Major additions or alterations must meet current seismic codes; upgrades to the existing structure would only be required if the modifications cause it to be in violation of any UBC provisions. In addition, buildings whose use or occupancy was legal at the time the UBC was adopted may continue to be used or occupied.

Cumulative Impacts. No cumulative effects on soils are anticipated. A short-term increase in demand for construction-related resources (particularly sand and gravel) is expected during expansion of the existing airfield and construction of related facilities. Because of the extensive sand and gravel deposits along the Mojave River and in alluvial terraces nearby, this short-term increase in demand is not expected to have a long-term effect on future sources of sand and gravel.

Mitigation Measures. Mitigation measures are available to minimize erosion problems associated with wind and water, especially during the construction phase when trenches and cut slopes are exposed. During construction, the length of time vegetation and other cover is absent should be minimized. When cut slopes are exposed, any of the following measures may be useful in limiting erosion:

- Add protective covering with mulch, straw or other synthetic material (tacking will be required).
- Limit the amount of area disturbed and the length of time slopes and barren ground are left exposed.
- Construct diversion dikes and interceptor ditches to divert water away from construction areas.
- Install slope drains (conduits) and/or water velocity-control devices to reduce concentrated high velocity streams from developing.

While mitigation measures will help reduce the amount of erosion that could occur as a result of construction-related activities, erosion by wind and water cannot be completely eliminated. Application of mulch, straw or synthetic material has proven very effective over the short term for controlling erosion, while the planting of windbreakers and revegetation are the most effective long-term means of reducing erosion. Soils typical of George AFB are highly erosive. The application of straw at the rate of about 1,000 pounds per acre would reduce the short-term erosion potential of these soils by about 65 percent while the application of 2,000 pounds per acre would reduce the short-term erosion potential by about 95 percent. Application of the straw would require tacking using a modified sheeps-foot.

After the construction phase, long-term erosion control can be effectively accomplished by keeping soils under vegetative cover and planting wind breaks perpendicular to the predominant wind direction. Revegetating with short grasses, barley, or alfalfa would reduce the long-term erosion potential by greater than 50 percent. The type of vegetation used as wind breaks must comply with FAA standards in areas intended for aircraft runways. After construction, soils underlying facilities and pavements will not be subject to erosion.

4.4.1.2 International Airport Alternative. Types of impacts associated with soils and geology under this alternative would be similar to those under the Proposed Action, except that the area affected is over twice as large as that disturbed under the Proposed Action. Effects on mineral resources (sand and

gravel) in the short term would be considerably greater under this alternative because of the large amount of new construction required. Although this is a large increase over the current and projected requirements for the Proposed Action, large quantities of sand and gravel are present along the Mojave River and in surrounding areas; therefore, the long-term impacts to aggregate resources in the region are considered minor.

Over 4,400 acres of undeveloped land north of the base would be disturbed as a result of extension of Runway 03/21, construction of a runway parallel to 03/21, and construction of two new parallel north-south runways and related support facilities. Impacts from soil erosion are considered to be short term because, once the construction phase is complete, areas subject to erosion would be covered by pavement, facilities or revegetation, thus reducing the erosion potential. Table 4.4-2 shows the total area to be disturbed under each land use category in each of the three phases (1993-1998, 1998-2003, and 2003-2013) after closure both on and off base. About 55 percent of the off-base land to be acquired will be disturbed by this alternative.

Table 4.4-2. Estimated Acreage to be Disturbed at 5, 10, and 20 Year Intervals - International Airport Alternative

	1993 - 1998		1998 - 2003		2003 - 2013		Total		
Land Use	On-Base	Off-Base	On-Base	Off-Base	On-Base	Off-Base	On-Base	Off-Base	Total
Airfield	-	-	876	3,169	-	-	876	3,169	4,045
Aviation Support	-	268	-	268	-	690	-	1,226	1,226
Commercial									
Hotel	477	-	-	-	-	-	447	-	477
Industrial									
General	687	-	-	-	-	-	687	-	687
Business Park	-	-	124	-	125	-	249	-	249
Aviation-related	-	-	217	-	-	186	217	186	403
Total	1,164	268	1,217	3,437	125	876	2,506	4,581	7,087

Cumulative Impacts. Cumulative short-term impacts associated with the increased local demand on aggregate resources in the area will have a larger impact when combined with the projected rapid growth in the immediate area. Long-term impacts on the availability of aggregate material should be minimal because there is an abundance of aggregate sources in the region.

Mitigation Measures. Potential mitigation measures would be similar to those discussed for the Proposed Action.

4.4.1.3 Commercial Airport with Residential Alternative. Land west and southeast of the runway is identified for residential, industrial, and aviation support uses under this alternative, and will sustain impacts similar to those of the Proposed Action. The total area expected to be disturbed by

construction-related activity is about 2,600 acres. In general, however, the majority of the construction will take place in areas that have already been disturbed by previous base construction. Table 4.4-3 shows the amount of area to be disturbed in each of the three phases (1993-1998, 1998-2003, and 2003-2013) after base closure.

Table 4.4-3. Estimated Acreage to be Disturbed at 5, 10, and 20 Year Intervals - Commercial Airport with Residential Alternative

	1993 - 1998		1998 - 2003		2003 - 2013		Total		
Land Use	On-Base	Off-Base	On-Base	Off-Base	On-Base	Off-Base	On-Base	Off-Base	Total
Aviation Support	67	-	67	-	69	-	203	-	203
Commercial/ Retail	14	-	9	-	-	-	23	-	23
Industrial	-	-	244	-	490	-	734	-	734
Institutional									
Medical	1	-	-	-	-	-	1	-	1
Education	22	-	-	-	-	-	22	-	22
Public	12	-	-	-	-	-	12	-	12
Residential	314	-	565	-	694	-	1,573	-	1,573
Total	430	-	885	-	1,253	-	2,568	-	2,568

Cumulative Effects. No cumulative effects on soils or geology are anticipated from other projects in the area.

Mitigation Measures. Potential mitigation measures would be similar to those discussed for the Proposed Action.

4.4.1.4 General Aviation Center Alternative. Under the General Aviation Center Alternative, a minimal amount of new construction will occur and nearly all operations would reuse existing facilities. The types of impacts would be similar to those of the Proposed Action. Limited new construction and renovation in the airfield and aviation support areas will create short-term impacts to soils by creating barren ground, cut slopes, and open excavations during the construction phase. Once construction is complete, the potential for erosion will be minimized because the majority of the area will be overlain by facilities or pavements. Overall, approximately 220 acres of land are expected to be disturbed under this alternative. All disturbance is expected to occur within 5 years of base closure (1993-1998).

Because all construction will take place in areas already developed, new areas of unique soils will not be disturbed. Because construction will be minimal, impacts to sand and gravel resources will also be minimal.

Cumulative Impacts. Cumulative impacts on soils and geology would not be likely to occur under this alternative.

Mitigation Measures. Types of mitigation measures would be similar to those discussed for the Proposed Action, but would be required on a smaller scale.

4.4.1.5 Non-Aviation Alternative. Under the Non-Aviation Alternative, existing facilities in the main cantonment area will be renovated for the institutional land use, existing base housing will be used for residential land use, and existing runways will be used both for residential and industrial uses. The types of impacts would be similar to those under the Proposed Action. Demolition of the existing runway will create short-term impacts to soils by creating barren ground, cut slopes, and open excavations during the construction phase. Once construction is completed, the potential for erosion would be minimized because the majority of the area will be overlain by facilities or pavements. Table 4.4-4 shows the total acreage to be disturbed in each of the three phases (1993-1998, 1998-2003, and 2003-2013) after closure.

Table 4.4-4. Estimated Acreage to be Disturbed at 5, 10, and 20 Year Intervals - Non-Aviation Alternative

	1993 - 1998		1998 - 2003		2003 - 2013		Total		
Land Use	On-Base	Off-Base	On-Base	Off-Base	On-Base	Off-Base	On-Base	Off-Base	Total
Commercial/ Retail	-	-	9	-	9	-	18	-	18
Industrial									
Business Park	165	-	165	-	330	-	660	-	660
Institutional									
Medical	1	-	-	-	-	-	1	-	1
Education	69	-	69	-	144	-	282	-	282
Public	12	-	-	-	-	-	12	-	12
Recreation	4	-	-	-	-	-	4	-	4
Vacant Land	15	-	-	-	-	-	15	-	15
Residential	709	-	921	-	1,140	-	2,770	-	2,770
Total	975	-	1,164	-	1,623	-	3,762	-	3,762

Cumulative Effects. Cumulative effects on soils and geology would not be likely to occur under this alternative.

Mitigation Measures. Potential mitigation measures would be similar to those discussed for the Proposed Action.

4.4.1.6 Other Land Use Concepts. As described in Section 2.3.5, several federal transfers and independent land use concepts have been identified. These actions may take place in addition to one of the integrated reuse alternatives.

U.S. Department of Justice. Potential impacts to soils may result from construction on undeveloped land. Impacts from erosion are expected to be short term during the construction phase when steep-walled trenches and

barren soil are exposed. Once construction is complete, the erosion potential will be minimized by revegetation or the presence of overlying facilities.

U.S. Department of Interior. This transfer would not create any impacts to soils or geology because no construction would be required.

U.S. Department of Housing and Urban Development. This transfer would not create any impacts to soils or geology because renovations will be minor and limited to painting, carpeting, and fixture replacement.

U.S. Department of Transportation. This transfer would not involve new construction, impacts to soils and geology are insignificant.

U.S. Department of Education. Impacts to soils and geology are expected to be insignificant because the majority of the properties/parcels are existing facilities.

San Bernardino County Work Furlough Program. Impacts to soils and geology to this action will be insignificant because new construction would be limited to minor renovation.

Medical Facilities. Impacts to soil and geology as a result of the conveyance of the base hospital will be insignificant because new construction, if any, would be limited to minor renovation.

4.4.1.7 No-Action Alternative. The No-Action Alternative would result in no major new impacts to the soils and geology of the base area and the surrounding region. The construction operations associated with this alternative would be minimal or non-existent and restricted to maintenance-type activities.

4.4.2 Water Resources

The following sections describe the potential impacts on water resources as a result of the Proposed Action and reuse alternatives. Construction activities could alter soil profiles and natural drainages, which, in turn, may alter water flow patterns temporarily. All development will be outside the 100-year flood plain of the Mojave River; therefore, severe flooding should not be a problem.

Projections of water demand are based on criteria used in Mojave Water Agency estimates that assume per capita water requirements (production) range from 180 to 257 gallons per day per person and that actual consumption (water lost through evaporation, etc., and not returned to the groundwater basin) is 50 percent of production.

4.4.2.1 Proposed Action

Surface Water. Under the Proposed Action, soils in the airfield and aviation-support area would be compacted during construction and overlain by asphalt, asphaltic concrete, or buildings, creating impervious surfaces that would cause increased storm water runoff to local storm sewers. Surface water and near-surface groundwater flow would be affected by the increased amount of impervious surfaces around the site. Drainage patterns would be altered to divert water away from facilities and off of the runways. The acquired land north and northeast of Runway 17/35 would be most affected by these types of construction activities. Stormwater discharge (non-point source) from the airfield may contain waste oils and other contaminants, which could degrade surface water and groundwater resources. Since all surface water flow is directed to the Mojave River, which is the primary source of recharge to the Mojave River Groundwater Basins, groundwater quality may be affected both locally and downstream.

Groundwater. Under the Proposed Action projected water production and consumption for the years 1998, 2003, and 2013 are shown in Table 4.4-5. Water demand will be about the same as current base demands in the year 2003, and will exceed current base demand by 1 to 3 percent by the year 2013. In the year 2013 water production demand is expected to range from 4.8 to 6.8 MGD (5,365 to 7,660 af/yr). It is assumed the water will be supplied by a local water purveyor. The 4.8 to 6.8 MGD water requirement is 1.7 to 2.4 times the current base production of 2.8 MGD but is expected to contribute only slightly to the overall drop in groundwater levels currently experienced in the Upper Mojave Basin.

Table 4.4-5. Projected Water Demand - Proposed Action

Year	Production (MGD)	Consumption (af/yr)	Contribution to Overdraft	Increase Over Current Base Operations
1993	–	–	–	–
1998	1.5 to 2.1	814 to 1,163	1-2%	About 1% less
2003	3.0 to 4.3	1,701 to 2,429	3%	0 to 1%
2013	4.8 to 6.8	2,682 to 3,830	4-5%	1 to 3%

Assuming that the entire water requirement is pumped from the local groundwater basin, and assuming 50 percent of production is returned to the groundwater basin through deep percolation from wastewater treatment plants, domestic irrigation, lakes, etc., the actual loss of groundwater from the basin under this alternative is estimated to range from 2,682 to 3,830 af/yr by the year 2013. This would contribute to the existing overdraft condition, and to the projected 2013 consumption rate of 76,000 af/yr, by about 4 to 5 percent. Compared to the ba average annual consumption rate (assuming

50 percent is returned to the groundwater basin), this would result in a net increase in basin wide consumption by 1 to 3 percent in the year 2013.

Groundwater withdrawal from the Upper Basin may have a negative impact on the availability of water further downstream. Pumping more water from the Upper Basin would reduce the amount of water available to reach the basins downstream and limit the amount of water occurring as surface flow at the Upper and Lower Narrows. Reduced surface flow at the Upper and Lower Narrows would result in negative environmental impacts to the biologic communities along the river (tui chub and other threatened and endangered species, see Section 4.4.5). Reduced flow to the Middle and Lower Basins would further increase overdraft conditions in these basins by reducing the amount of water being allowed to recharge this part of the basin. Before the new developers/development agency could extract water from the Upper Mojave Groundwater Basin, they may be required to obtain a license from the State Water Resources Control Board.

Cumulative Impacts. No other major projects have been identifed. Increased demand associated with the rapid regional growth has been taken into account in the analysis. Therefore, no cumulative impacts have been identified for the region.

Mitigation Measures. To minimize ponding in new areas, construction designs should incorporate provisions for increased stormwater runoff. These mitigation measures would be incorporated into the design and construction of any new facilities. Construction designs would be required to account for the increased surface runoff to the Mojave River in order to prevent groundwater quality degradation. To protect groundwater quality, the project may also be subject to the NPDES permit system for stormwater discharges during the construction period and for the duration of airport operation. This provision is contained in the NPDES Permit Application Regulations for Storm Water Discharges issued by the EPA as final rule on November 16, 1990. This permit is required for all construction activities that would disturb more than 5 acres and for major transportation facilities that have vehicle maintenance areas, equipment cleaning areas, and airports.

The Mojave Water Agency has been investigating ways to supplement groundwater sources in the Mojave Desert for several years. Any alternative that uses groundwater resources would contribute to the existing overdraft conditions currently experienced in the Upper, Middle, and Lower Mojave Basins. Extraction of groundwater resources may require a license from the State Water Resources Control Board. Possible alternative sources of water include:

- Purchase of the total 50,800 af/yr allotment from the State Water Project
- Water conservation
- Water reuse

- Water marketing (or water transfers) including water exchanges, water rights sales, water ranching/farming, and interbasin transfers (Pirnie, 1990)
- Combined use of surface and groundwater
- Any combination of the above.

Purchase of the 50,800 af/yr allotment from the State Water Project in itself would not be sufficient to solve the water shortage problems projected for this area even with no reuse at George AFB. In addition, with drought conditions currently being experienced, the total allotment for the Mojave Basins may not be available from the SWP.

4.4.2.2 International Airport Alternative

Surface Water. Under the International Airport Alternative, approximately 8,300 acres of undeveloped land north of the current base boundary would be graded, recontoured, paved, and have facilities constructed upon it. In the absence of a detailed airport layout plan it is assumed that over 50 percent of the airfield area will be overlain by asphalt, asphaltic concrete, etc. and will result in increased storm water runoff from this area. As a result, natural drainage patterns will be altered to divert water away from the airfield and aviation support areas. Extension of Runway 03/21 may alter the natural drainage of the industrial storm drain that runs from the southeast side of the flightline area, around the northeast end of the runway, and into the Mojave River. The approximately 8,300 acres north of the existing base will have the greatest impacts. Storm water discharge (non-point source) from the airfield may contain waste oils and other contaminants that could degrade local surface and groundwater resources.

Groundwater. Under the International Airport Alternative, water production and consumption for the years 1998, 2003, and 2013 are shown in Table 4.4-6. As shown in this table, water demand will exceed the current base demand by 3 to 5 percent in the years 1998 and 2003, and will exceed the current base demand by 5 to 8 percent in 2013. Groundwater production demand in 2013 is expected to range from 10.2 MGD to 14.6 MGD (11,428 af/yr to 16,318 af/yr). It is assumed that water will be provided by a local purveyor. The projected water requirement under this alternative is 3.6 to over 5 times the current average annual base production.

If the entire water requirement is drawn from the groundwater supplies, this would contribute substantially to current and projected overdraft conditions. Assuming that 50 percent of the water is consumed (i.e., permanent loss from the groundwater basin), the actual loss of groundwater from the basin would be between 5,714 af/yr and 8,159 af/yr by the year 2013. This would contribute to the existing overdraft condition by a maximum of about 11 percent of the

Table 4.4-6. Projected Water Demand - International Airport Alternative

Year	Production (MGD)	Consumption (af/yr)	Contribution to Overdraft	Increase Over Current Base Operations
1993	—	—	—	—
1998	5.8 to 8.2	3,225 to 5,246	5 to 8%	3 to 5% greater
2003	6.6 to 9.4	3,674 to 5,246	6 to 8%	3 to 5% greater
2013	10.2 to 14.6	5,714 to 8,159	8 to 11%	5 to 8% greater

projected consumption rate in 2013. Assuming that base consumption is 50 percent of the current production, the net increase in the contribution to the existing overdraft condition would be between 5 and 8 percent by the year 2013.

Cumulative Impacts. As with the Proposed Action, no cumulative impacts associated with water resources are expected in the region.

Mitigation Measures. Under the International Airport Alternative construction designs need to account for increased storm water runoff. In addition, designs for the extension of Runway 03/21 will have to take into account the natural drainage pattern of the industrial storm drain that currently extends around the northeast side of the runway by either incorporating a drainage culvert under the runway or some other means to allow continued drainage of the storm drain. The project may also be subject to the NPDES permit system for storm water discharges during the construction period and during airport operations. As with the Proposed Action, alternative sources of groundwater need to be reviewed on a regional basis if overdraft conditions are to be curtailed. The additional water requirements under this alternative will require alternative sources of water on a more rapid schedule.

4.4.2.3 Commercial Airport with Residential Alternative

Surface Water. Effects on surface water are expected to be identical to those of the Proposed Action with the exception of effects related to off-base airfield and aviation-support areas, which would not be acquired under this alternative.

Groundwater. Under the Commercial Airport with Residential Alternative, projected water production and consumption for the years 1998, 2003, and 2013 are shown in Table 4.4-7. Water demand is expected to be about equal to current base demand by the year 2013. In 2013 water production demand is projected to range from 2.5 to 3.6 MGD. Water is assumed to be supplied by a local water purveyor. Although this alternative would use about the same quantity of water as current base activities, any withdrawal of water from the groundwater basin would contribute to the existing overdraft condition and would create a negative impact.

Table 4.4-7. Projected Water Demand - Commercial Airport with Residential Alternative

Year	Production (MGD)	Consumption (af/yr)	Contribution to Overdraft	Increase Over Current Base Operations
1993	–	–	–	–
1998	0.9 to 1.3	506 to 722	about 1%	1 to 2% less
2003	1.6 to 2.2	874 to 1,247	1 to 2%	0 to 1% less
2013	2.5 to 3.6	1,420 to 2,027	2 to 3%	about same

Assuming that consumption will equal 50 percent of production, the estimated consumption for this alternative is projected to range from 1,420 af/yr to 2,027 af/yr by the year 2013. This would contribute a maximum of 3 percent of the projected 2013 consumption rate. The net increase over current base consumption to the existing overdraft condition would be a maximum of 0.6 percent by the year 2013.

Cumulative Impacts. No cumulative impacts have been identified.

Mitigation Measures. Types of mitigation measures would be the same as those identified under the Proposed Action, but would be required on a slower schedule.

4.4.2.4 General Aviation Center Alternative

Surface Water. Effects on surface water are not expected to change over baseline conditions (i.e., closure) since most reuse activities are expected to take place in existing facilities.

Groundwater. Under the General Aviation Center Alternative, projected water production and consumption for the years 1998, 2003, and 2013 are shown in Table 4.4-8. As shown, water demand under this alternative is not expected to exceed current base demand over the 20-year period. In 2013 water production demand is estimated to range from 1.5 MGD (1,714 af/yr) to 2.2 MGD (2,448 af/yr). Water is assumed to be supplied by a local water purveyor. The General Aviation Center is expected to require less water than current base operations. However, as with all reuse alternatives, any groundwater withdrawal from the groundwater system will contribute to the existing overdraft condition and will result in a negative impact.

Assuming consumption to be 50 percent of production, the estimated consumption for this alternative would range from 857 af/yr to 1,224 af/yr. This would contribute about 2 percent of the projected consumption for the year 2013. Assuming that base consumption is 50 percent of production, the net

Table 4.4-8. Projected Water Demand - General Aviation Center Alternative

Year	Production (MGD)	Consumption (af/yr)	Contribution to Overdraft	Increase Over Current Base Operations
1993	–	–	–	–
1998	1.0 to 1.5	575 to 821	about 1%	1 to 2% less
2003	1.4 to 2.0	790 to 1,128	1 to 2%	about 1% less
2013	1.5 to 2.2	857 to 1.224	1 to 2%	about 1% less

contribution to overdraft conditions would be about 1 percent less than current base consumption values.

Cumulative Impacts. No cumulative impacts have been identified in the region.

Mitigation Measures. Mitigation measures would be similar to those identified under the Proposed Action, but would be required on a slower schedule.

4.4.2.5 Non-Aviation Alternative

Surface Water. Effects on surface water would be minimal since all construction and/or demolition will be confined to existing base property. Residential and industrial development in the existing airfield area will require installation of stormwater sewer systems which should be incorporated into the construction design. Effects on surface and groundwater quality are expected to be positive from this alternative, since the inflow of industrial hazardous materials would be reduced.

Groundwater. Under the Non-Aviation Alternative projected water production and consumption for the years 1998, 2003, and 2013 are shown in Table 4.4-9. Water demand for this alternative is expected to be about the same as current base demand by the year 2013. In the year 2013 groundwater production demand is estimated to range from 2.2 to 3.2 MGD. It is assumed that water will be obtained by a local water purveyor. This alternative is projected to require about the same amount of water in 2013, as current base activities (average annual base production is 2.8 MGD). However, any withdrawal of water from the groundwater basin will contribute to the existing overdraft condition and will have a negative impact.

Assuming consumption to be 50 percent of production, the estimated consumption values for this alternative range from 1,260 af/yr to 1,799 af/yr. This would contribute about 2 percent of the projected annual consumption for 2013. Assuming that base consumption is 50 percent of current production, the net increase in contribution to the existing overdraft condition would be a maximum of 0.3 percent by the year 2013.

Table 4.4-9. Projected Water Demand - Non-Aviation Alternative

Year	Production (MGD)	Consumption (af/yr)	Contribution to Overdraft	Increase Over Current Base Operations
1993	–	–	–	–
1998	0.5 to 0.8	308 to 440	about 1%	about 2% less
2003	1.0 to 1.5	573 to 818	about 1%	about 1% less
2013	2.2 to 3.2	1,260 to 1,799	1 to 2%	about the same

Cumulative Impacts. No cumulative impacts have been identified in the region.

Mitigation Measures. Types of mitigation measures would be the same as those identified under the Proposed Action, but would be required on a slower schedule.

4.4.2.6 Other Land Use Concepts. Only the proposed FCC requested by the BOP would result in an impact to water resources. The remaining federal transfers and independent land use concepts would not add significantly to the water shortage problems currently experienced or expected to be experienced in the future.

Based on per-capita water production estimates of 180 to 257 gallons per person per day, water production requirements for this facility are estimated at between 0.4 and 0.8 MGD. When this federal transfer is overlain with the other reuse alternatives, a reduction in total population of about 10 percent for the Proposed Action and about 5 percent for the International Airport Alternative occurs. As a result, water requirements for these alternatives would likewise be reduced by the same amount. When this federal transfer is overlain with the Commercial Airport with Residential, General Aviation Center, and Non-Aviation alternatives, a net increase in regional population occurs (5 percent for Commercial with Residential and 8 percent with the Non-Aviation). As a result, water requirements for the region would similarly increase by the same amount. The overall effect on the groundwater basin would result in only a minor increase or decrease in groundwater levels.

4.4.2.7 No-Action Alternative. Effects would be limited to positive changes in surface and groundwater quality. With very limited operations, inflow of new hazardous materials would be reduced. With no increase in personnel, contribution to the existing overdraft conditions would be very minimal, limited to water consumption by the 50 DMT employees for security and maintenance activities.

Cumulative Impacts. With very limited activity, base-related impacts to water resources will be minimal; however, the continued rapid growth in the desert communities will continue overdraft conditions of the groundwater basins.

Mitigation Measures. Mitigation measures initiated by the Air Force will not be necessary because no impacts are anticipated. Alternative sources of water will still be required for the communities.

4.4.3 Air Quality

Air quality impacts could occur during construction and operations associated with the Proposed Action and alternatives for the reuse of George AFB. Construction-related impacts could result from fugitive dust (particulate matter) and construction equipment emissions over an intermittent period of 20 years. Operational impacts could occur from: (1) mobile sources such as aircraft, aircraft operation support equipment, commercial transport vehicles, and personal vehicles; (2) point sources such as heating/power plants, generators, incinerators and storage tanks; and (3) secondary emission sources associated with a general population increase, such as residential heating.

The methods selected to analyze impacts depend upon the type of air emission source being examined. The primary emission source categories associated with the Proposed Action and the alternatives include construction, aircraft, vehicles, point sources, and indirect source emissions related to population increase. Because construction phase emissions are generally considered temporary and not subject to air quality regulation, analysis is limited to estimating the amount of uncontrolled fugitive dust that may be emitted from disturbed areas. Analysis for point source and indirect source emissions consists of quantifying the emissions and evaluating how those emissions would affect progress toward attainment or maintenance of the NAAQS and CAAQS. The ambient effects of aircraft and mobile source emissions are analyzed by modeling. The Emissions and Dispersion Modeling System (EDMS) is used to simulate the dispersion of emissions from airport operations (USDOT, 1988). The model is run in a screening mode utilizing an array of 1-hour worst-case meteorological conditions.

The following assumptions were made in estimating the effects of the Proposed Action and alternatives:

- For the following source categories, emission inventory amounts for PM_{10}, SO_2, and CO are based on the ratio of source emissions to population, as defined by the 1987 emission inventory for the San Bernardino County portion of the SEDAB (ARB,1990): fuel combustion; waste burning; solvent use; petroleum storage and transfer; industrial processes; miscellaneous processes (includes farming operations, construction and demolition, entrained road dust, fires, and other natural sources); and off-road vehicles. Control measures implemented after

1987 are assumed to provide only small percentage emission reductions for these source categories.

- For the same source categories as above, and for the on-road vehicle category, emission inventory amounts for hydrocarbons (ROG) and NO_x are based on the ratio of source emissions to population, as defined by the 1991 Draft Air Quality Attainment Plan planning emission inventory forecasts (SBCAPCD, 1991). The planning inventory forecasts account for the effect of future control measures.
- For the on-road vehicle category, emission inventory amounts for PM_{10}, SO_2, and CO are based on the ratio of source emissions to population, as defined by the 1987 emission inventory for the San Bernardino County portion of the SEDAB (ARB,1990). In addition, a factor based on the change in mobile source vehicle emission rates (as predicted by the ARB's EMFAC7 emission rate program) is applied to account for the more stringent tailpipe exhaust emission standards that would apply in future years.
- For the aircraft ground operation and aerospace ground equipment categories, emission inventory amounts are based on the ratio of emissions to flight operations, as defined by the 1988 George AFB inventory data.

4.4.3.1 Proposed Action. Total estimated emissions of the Proposed Action are presented in Table 4.4-10 for the years 1993, 1998, 2003, and 2013. The estimates of aircraft emissions contained in the table are based on EPA aircraft emission factors provided as part of the built-in data base of the EDMS model. The EDMS model uses the EPA emission factors and information on peak and annual LTO cycles to produce an emissions inventory report for the aircraft operations. Emissions for all other categories of emissions were calculated as described in Appendix L.

Table 4.4-10. Pollutant Emissions Associated with the Proposed Action (tons/day)

Pollutant	Attainment Level	1987 Emissions Inventory Amount (a)	1993	1998	2003	2013
NO_x	94(b)	134	1.05	3.38	3.25	7.79
ROG	35(b)	50	0.33	1.74	1.98	3.05
PM_{10}	57(c)	100	0.03	3.63	7.17	11.25
SO_2	275(d)	11	0.06	0.45	0.85	1.28
CO	560(d)	190	1.00	6.90	11.71	17.46

Notes: (a) Emissions are from the San Bernardino County portion of the Southeast Desert Basin (ARB, 1990; SBCAPCD, 1991).
(b) Area currently in nonattainment of ozone standard. Attainment projected to occur in 1994 (SBCAPCD, 1991).
(c) Area currently in nonattainment of PM_{10} standards. Projected attainment date unknown. SBCAPCD currently preparing attainment plans for this pollutant.
(d) Area currently attaining standards for this pollutant.

Construction. Fugitive dust and combustive emissions would be generated during construction activities associated with airfield, aviation support,

industrial, and commercial land uses. These emissions would be greatest during site clearing and grading activities. Uncontrolled fugitive dust (particulate matter) emissions from ground-disturbing activities would be emitted at a rate of 1.2 tons per acre per month (U.S. EPA, 1985a). The PM_{10} fraction of the total fugitive dust emissions is assumed to be 50 percent, or 0.6 tons per acre per month.

It is estimated that construction of runway extensions and resurfacing of the existing runways, demolition and renovation of buildings in the aviation support and commercial land use areas, and construction of an industrial business park in the industrial land use area would disturb a total of approximately 2,641 acres over the 20-year period of project development. The average amount of land area that would be disturbed at any one time during these construction activities is 132 acres. The average unmitigated amount of particulate matter emissions would therefore be 158 tons per month (79 tons per month of PM_{10}). The impact of these emissions would cause elevated short-term concentrations of particulates at receptors close to the construction areas. However, the elevated concentrations would be a temporary effect that would fall off rapidly with distance.

Operation. Potential impacts to air quality as a result of air emissions from the operation of the Proposed Action were evaluated in terms of two spatial scales: regional and local. The regional-scale analysis considered the potential for project emissions to cause or contribute to a nonattainment condition in the San Bernardino County portion of the SEDAB. The local-scale analyses evaluated the potential impact to ambient air quality concentrations in the immediate vicinity of the Proposed Action. The following sections present the results of these analyses and provide a comparison of the potential air quality effects of the Proposed Action to the various project alternatives.

<u>Regional Scale</u>

The California Clean Air Act of 1988 (CCAA) (Chapter 1568 of the California Health and Safety Code) and the federal Clean Air Act Amendments of 1990 (CAAA) establish a variety of air emission management and control requirements which will affect both existing and future sources of air pollution in the state of California. The CCAA in some respects is more restrictive than the CAAA in that the CCAA requires all air districts in California to achieve and maintain the CAAQS, which are set at lower levels than the corresponding NAAQS. The CCAA further requires each air district to achieve annual emission reductions of nonattainment pollutants of 5 percent or more until attainment is reached, compared to about 3 percent annual reductions under the CCAA. The CCAA also empowers the California air districts with the authority to impose a variety of transportation control measures and controls on indirect and area emission sources as required to reach and maintain attainment.

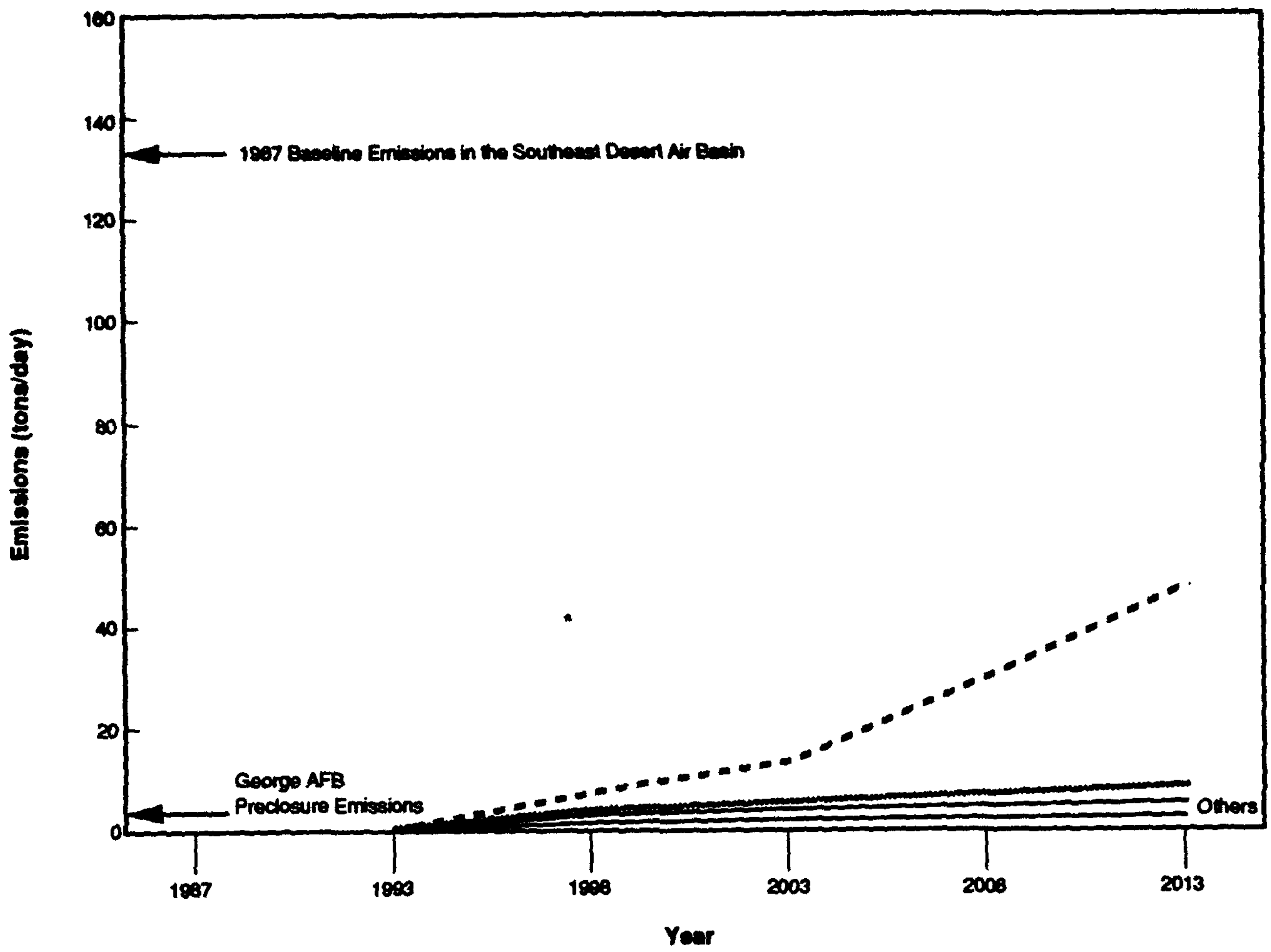
As a result, the evaluation of regional-scale impacts from the Proposed Action has considered the effect any new air emissions would have on the air quality attainment status of the Southeast Desert Air Basin. Because of the different requirements which apply to nonattainment pollutants versus attainment pollutants, this analysis is best subdivided by pollutant. The following paragraphs summarize the results of the regional-scale impact analysis.

The SEDAB currently does not meet the CAAQS for ozone, and portions of the basin do not meet the NAAQS for ozone. However, since ozone is not a directly-emitted pollutant, emissions of its precursor pollutants NO_x and ROG are regulated instead. The SBCAPCD has recently released a 1991 Draft Air Quality Attainment Plan (DAQAP) which describes the methods by which SBCAPCD plans to reduce the emissions of NO_x and ROG in the SEDAB to meet the requirements of the CCAA and achieve attainment of the ozone standard (SBCAPCD, 1991). Based upon the analyses provided in the DAQAP, SBCAPCD has identified the level of basin-wide NO_x and ROG emissions which would result in attainment of the ozone standard. Accounting for growth projections in the region, and factoring the effect of emission reduction measures (both existing and proposed), SBCAPCD has projected attainment of the CAAQS for ozone by 1994.

The potential NO_x and ROG emissions from the Proposed Action were evaluated in terms of how those emissions would affect SBCAPCD's progress toward attainment and maintenance of the CAAQS for ozone. Emission rates for NO_x and ROG were calculated for the direct sources that would be associated with each alternative reuse action, as well as for emissions resulting from increased mobile vehicle activity and other indirect sources linked to direct and indirect population growth associated with the reuse alternative. These emission increases, after accounting for the source-specific reductions associated with SBCAPCD-planned control measures, would be in addition to the emission levels projected in the DAQAP.

Table 4.4-10 summarizes the results of the emission calculations for the Proposed Action for 0, 5, 10, and 20 year increments after closure (i.e., for the years 1993, 1998, 2003, and 2013, respectively). This table also provides a comparison of the magnitude of the reuse-related emissions in relation to the attainment level (the basin-wide level of emissions above which the area would be in nonattainment) and the 1987 emission inventory amount for the San Bernardino County portion of the SEDAB. Figures 4.4-1 and 4.4-2 illustrate the relative level of NO_x and ROG emissions, respectively, for the Proposed Action and each alternative in comparison to the 1987 basin-wide emission totals and the George AFB preclosure emission level.

These results show that emissions of NO_x and ROG could interfere with the process of reaching the attainment levels by the year 1994, and maintaining those levels after 1994. All NO_x and ROG emissions associated with the



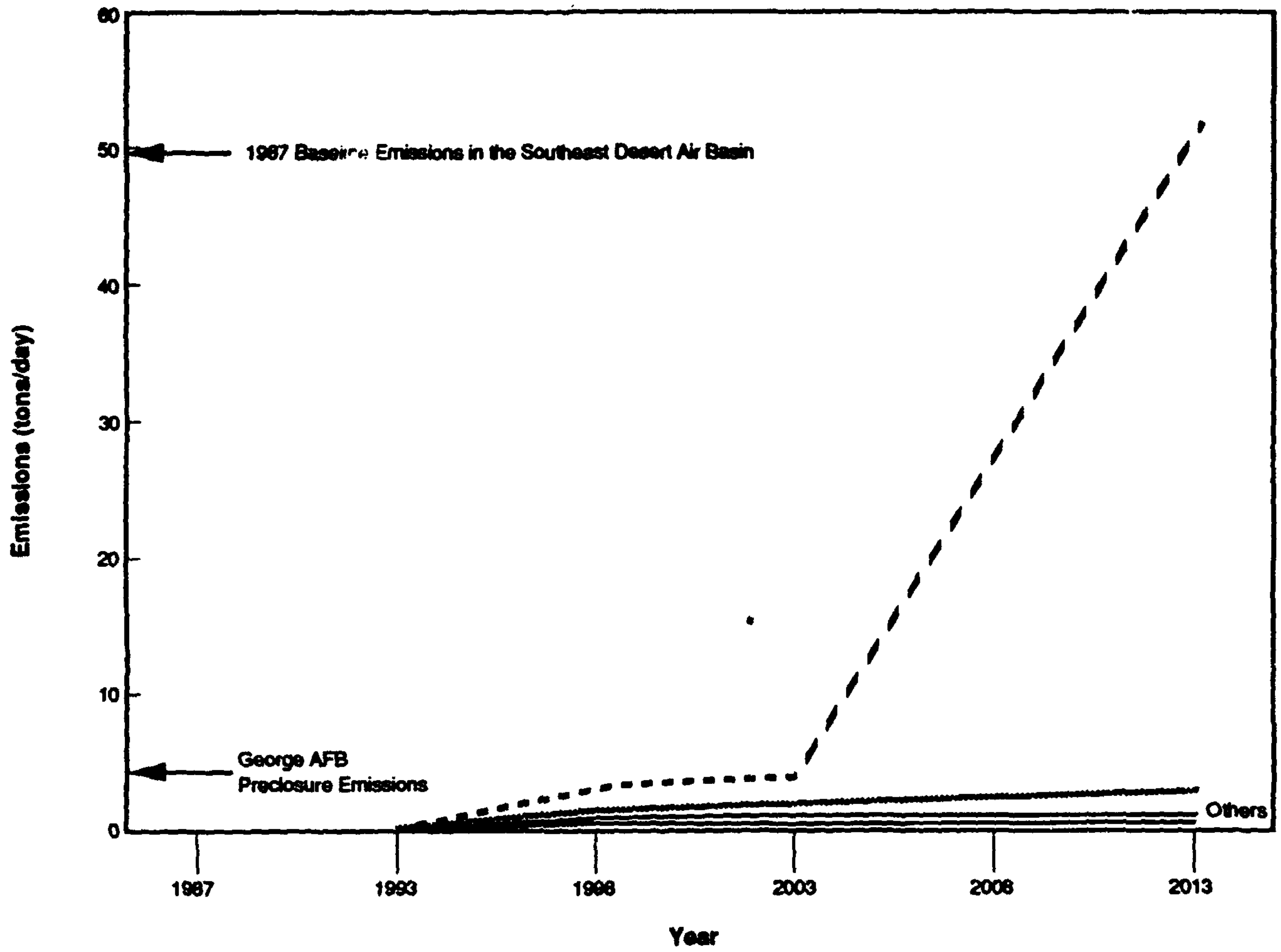
EXPLANATION

Proposed Action

International Airport

NO_x Emissions from George AFB Reuse Alternatives

Figure 4.4-1



EXPLANATION

Proposed Action

International Airport

ROG Emissions from George AFB Reuse Alternatives

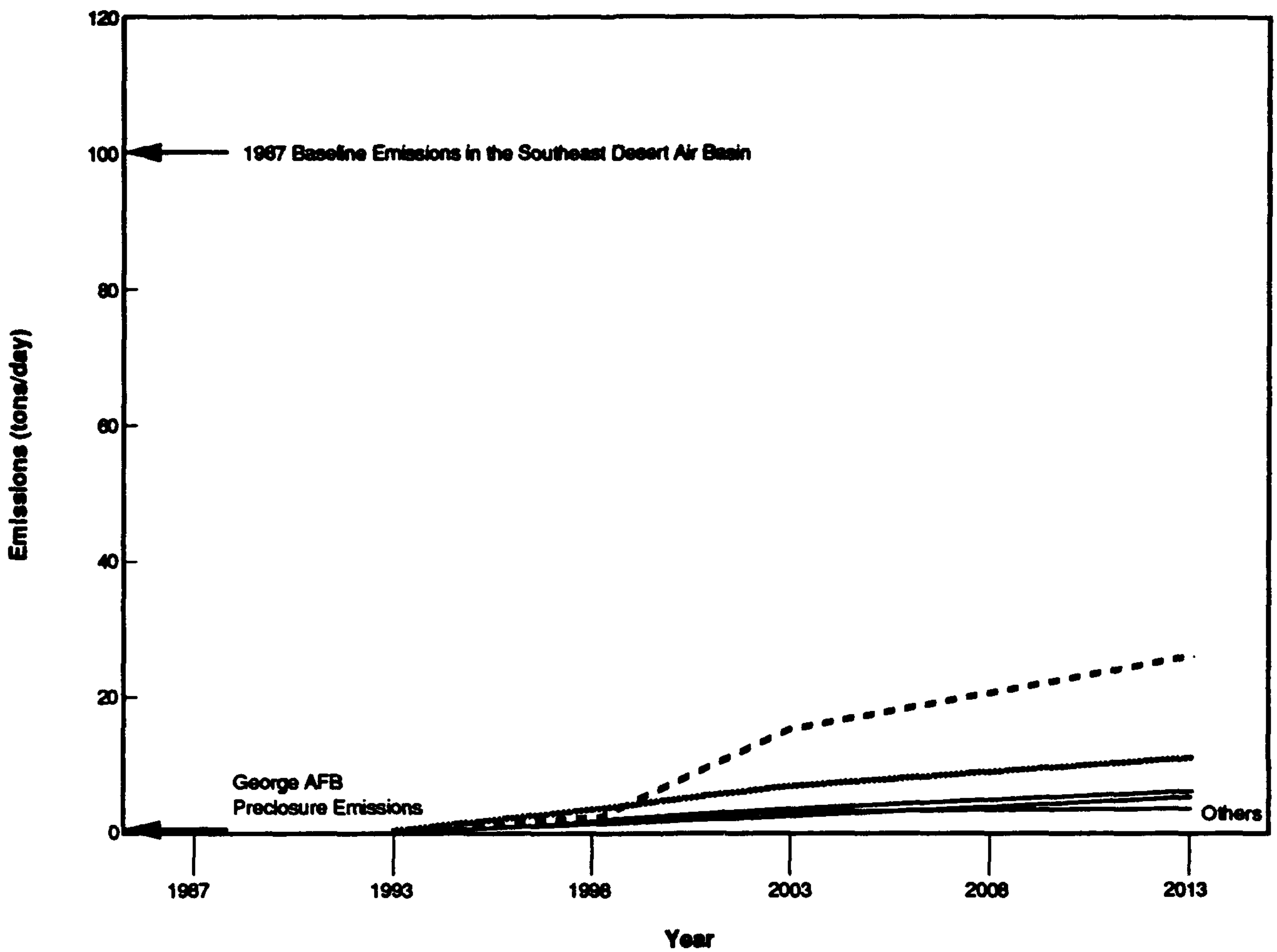
Figure 4.4-2

Proposed Action will therefore have to be mitigated to the fullest extent possible, and the remaining portions will have to be fully offset by the reduction of emissions from other sources in the area. Potential mitigation measures and the offset process are discussed below in the mitigation section of this text.

The San Bernardino County portion of the SEDAB does not currently meet the CAAQS and NAAQS for PM_{10}. The SBCAPCD is currently preparing a DAQAP for PM_{10} to evaluate the emission control measures which are necessary to achieve attainment. This information was not available for this EIS, so the PM_{10} attainment level was estimated by assuming that the ratio of second highest observed 1987 PM_{10} concentration to the PM_{10} standard was the same as the ratio of the PM_{10} 1987 emission baseline to the PM_{10} attainment level. The attainment level calculated in this fashion is 57 tons per day, compared to the 1987 baseline PM_{10} emission level of 100 tons per day. However, since approximately 77 percent of the PM_{10} emissions in the SEDAB are attributable to natural sources such as road dust and windblown dust, attainment of the CAAQS for PM_{10} will be difficult to achieve by controlling the small contribution of emissions from other sources.

Table 4.4-10 provides a comparison of the magnitude of the reuse-related emissions in relation to the estimated attainment level for PM_{10}. Figure 4.4-3 illustrates the relative level of PM_{10} emissions for the Proposed Action and each alternative in comparison to the 1987 basin-wide emission total and the George AFB preclosure emission level. These results show that emissions from the Proposed Action would interfere with the process of reaching attainment of the CAAQS and NAAQS for PM_{10}. PM_{10} emissions associated with the Proposed Action will therefore have to be mitigated to the fullest extent possible and the remainder offset by the reduction of PM_{10} emissions from other sources in the area.

The SEDAB currently meets the CAAQS and NAAQS for NO_2, CO, and SO_2. Because the area is in attainment for these pollutants, SBCAPCD has not made detailed estimates of future emissions of these pollutants, and has not been required to establish specific emission reduction measures (except for NO_2, which is managed as a result of its precursor role as NO_x in ozone nonattainment as described above). The process by which emissions of these attainment pollutants are prevented from creating a nonattainment condition is called Prevention of Significant Deterioration (PSD). This process, which is currently administered by EPA in San Bernardino County until the APCD develops its own approved PSD program, limits the allowable ambient impact of emissions from new major stationary sources or major modifications to specific increments designed to prevent any significant degradation of the area's acceptable air quality. However, the PSD process currently applies only to NO_2, SO_2, and particulate emissions (not CO), and does not provide a mechanism for dealing with non-stationary sources such as motor vehicles and aircraft.



EXPLANATION

Proposed Action

International Airport

PM_{10} Emissions from George AFB Reuse Alternatives

Figure 4.4-3

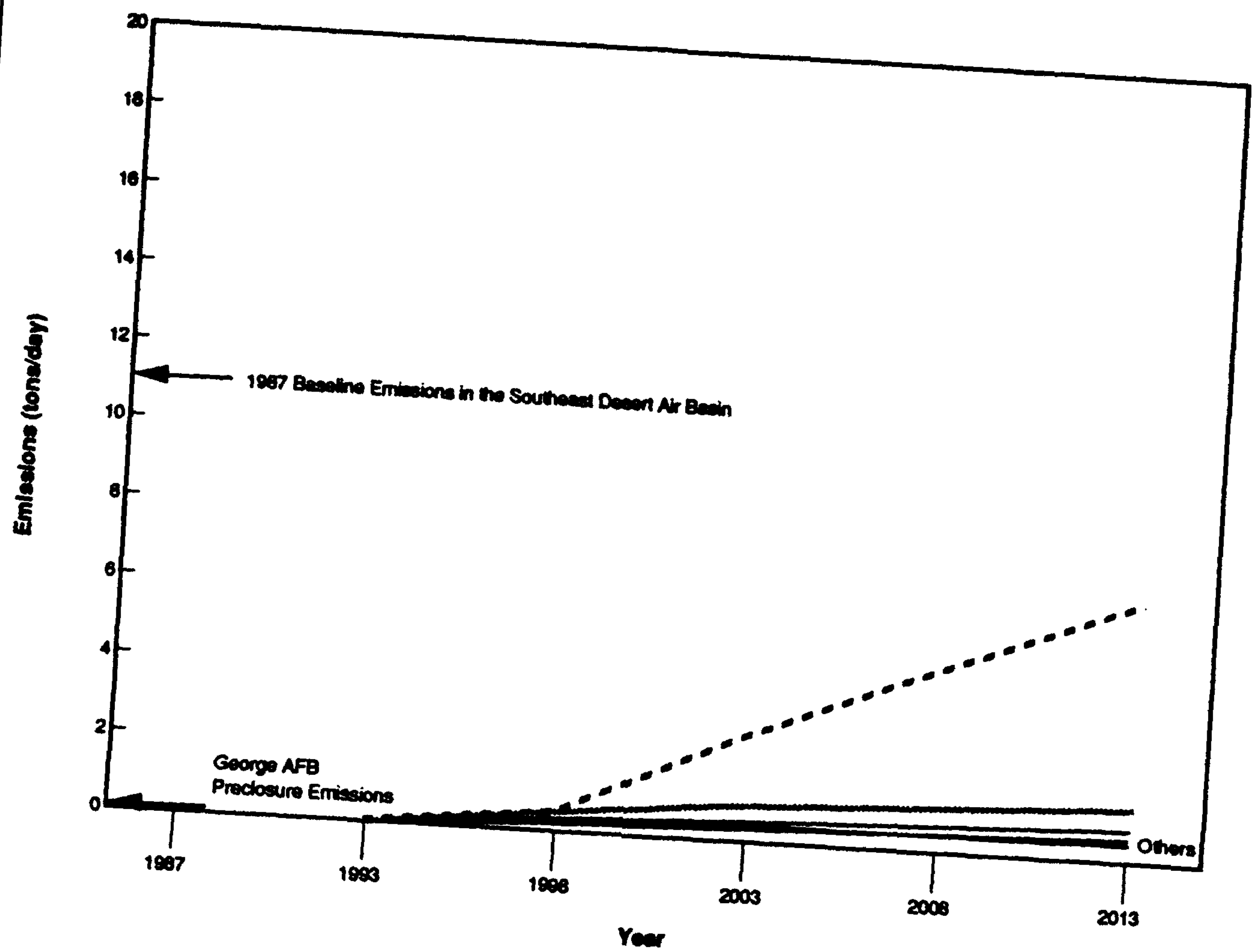
Most of the SO_2 and CO emissions associated with the Proposed Action and alternatives would arise from mobile sources. Because mobile sources do not trigger PSD analysis, and CO is not covered by PSD at all, this analysis examines the potential for these emissions to cause a nonattainment situation at some future time. To do this, it was necessary to estimate the basin-wide emission level for SO_2 and CO which would result in a nonattainment condition in the SEDAB. This was accomplished by comparing the 1987 baseline emission levels to the 1987 ambient concentrations for these pollutants as described above for PM_{10}. The "attainment levels" calculated in this fashion are 275 tons per day for SO_2 and 560 tons per day for CO, compared to 1987 baseline emission levels of 11 tons per day and 190 tons per day, respectively.

Table 4.4-10 summarizes the calculated emission rates for SO_2 and CO and also provides a comparison of the magnitude of the reuse-related emissions in relation to the estimated attainment levels for the two pollutants. Figures 4.4-4 and 4.4-5 illustrate the relative level of SO_2 and CO emissions for the Proposed Action and each alternative in comparison to the 1987 basin-wide emission total and the George AFB preclosure emission level.

These results show that the Proposed Action emissions of SO_2 and CO will not be sufficient to jeopardize the attainment status for these pollutants. Current baseline emissions in the basin are well below the levels which would cause nonattainment, and the Proposed Action emissions are only a small fraction of the baseline. In addition, long-term emission trends prepared by the EPA indicate that both SO_2 and CO emissions are declining across the nation and will continue to decline (U.S. EPA, 1991). The SO_2 emission decreases are attributed primarily to three general changes: (1) installation of fuel gas desulfurization controls, (2) reduction in the average sulfur content of fuels, and (3) implementation of emission controls on various industrial processes. CO emission reductions have been realized primarily due to the increasingly stringent motor vehicle emission control requirements. Emission reductions from these requirements have more than offset the CO increases related to population growth and increased vehicle miles traveled.

Local Scale

The impacts of emissions associated with operation of the Proposed Action commercial airport were assessed by use of the Emissions and Dispersion Modeling System. The EDMS was developed by the FAA and the U.S. Air Force specifically to prepare airport or air base emission inventories, and to calculate the concentrations caused by these emissions as they disperse downwind. Peak-hour scenarios for emissions from both aircraft operations and vehicle traffic serving the airport were modeled. A variety of worst-case meteorological conditions which combined 1 meter per second windspeed with A, D, or F stability class were used as input in conjunction with wind directions both parallel and perpendicular to the runways and major terminal roadways.



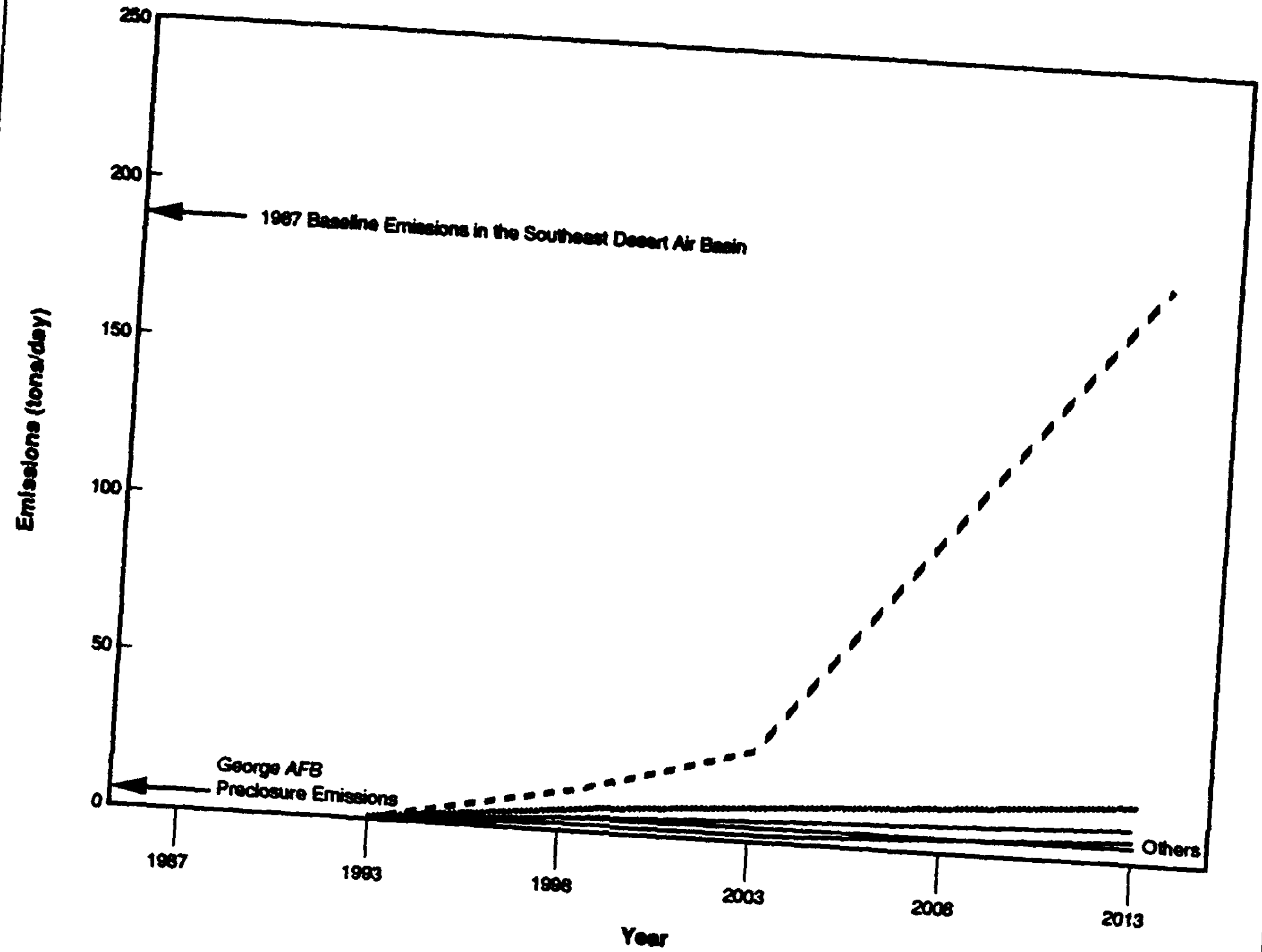
EXPLANATION

Proposed Action

International Airport

SO_2 Emissions from George AFB Reuse Alternatives

Figure 4.4-4



EXPLANATION

Proposed Action

International Airport

CO Emissions from George AFB Reuse Alternatives

Figure 4.4-5

Ambient temperature was assumed to be 70°F, and traffic on the roadways was assumed to be operating in a 20 percent cold start mode, while traffic in the parking areas was assumed to be 80 percent cold start. EPA conversion factors were used to convert the model-predicted 1-hour impact results to conservative screening-level estimates of longer averaging period concentrations (U.S. EPA, 1977). The actual long-term averages would be less than the values produced by use of the conversion factors.

A summary of the EDMS analysis is presented in Table 4.4-11. The results show that for a peak-hour airport operation scenario, the maximum 1-hour pollutant concentration would occur at a receptor located along the airport property boundary downwind from the northeast end of the NE-SW runway (Runway 03/21). This receptor is located along the centerline of the runway, and is approximately 4,000 feet from the end of the runway. The primary contribution to the impact at this location is from the aircraft exhaust emitted during takeoffs. The modeling results indicate that NO_2 concentrations would exceed standards in the immediate area surrounding the airport, in particular, that area extending from the ends of the runways.

Table 4.4-11. Air Quality Modeling Results for the Proposed Action ($\mu g/m^3$)

Pollutant	Averaging Time	Project Impact[a] 1993	1998	2003	2013	Background Concentration[b]	Limiting Standard[c]
CO	8-hour	60	638	818	1,224	4,500	10,000
	1-hour	86	911	1,169	1,749	7,424	40,000
NO_2	Annual	91	94	98	100	25	100
	1-hour	619	646	692	711	172	470
SO_2	Annual	7	9	11	13	5	80
	24-hour	29	37	44	50	47	131
	3-hour	65	84	100	113	121	1,300
	1-hour	73	94	111	126	121	655
PM_{10}	Annual (geometric)	1.8	3.0	2.9	3.3	44.1	30
	Annual (arithmetic)	1.8	3.0	2.9	3.3	48.1	50
	24-hour	7.1	12.2	11.7	13.2	112	50

Notes: (a) Maximum impact in all cases occurred at a receptor located on the property line approximately 4,000 feet downwind from the northeast end of the NE-SW runway (Runway 03/21).

(b) Background concentrations assumed to equal the mean of first-high values monitored at the Victorville, Phelan, and Hesperia monitoring stations during 1987 to 1989.

(c) Nitrogen dioxide impact concentrations calculated by use of the ozone limiting method of Cole and Summerhays (1979). Ten percent of NO_x assumed to be thermally converted to NO_2. Conversion of the remainder of NO_x to NO_2 is limited by the background concentration of ozone. Background ozone concentrations assumed to equal the mean of first-high values monitored at the Victorville, Phelan, and Hesperia monitoring stations during 1987 to 1989: 1-hour ozone background = 408 $\mu g/m^3$; annual ozone background = 70 $\mu g/m^3$.

PM_{10} concentrations may also exceed standards when added to the background concentration. However, the actual PM_{10} background concentration which would occur in future years is not known with certainty. The PM_{10} background may decline in future years if new control strategies are implemented and successful, but this does not seem likely given the large amount of uncontrollable natural sources of PM_{10} within the SEDAB.

Cumulative Impacts. No other projects have been identified that would cause adverse cumulative air quality impacts as a result of development of the Proposed Action. Development of the proposed SST would be beneficial to air quality because emissions associated with vehicle transport of passengers to and from the airport would be reduced.

Mitigation Measures. Air quality impacts during construction would occur from (1) fugitive dust emissions from ground-disturbing activities and (2) combustive emissions from construction equipment. The future project proponent (e.g., redevelopment authority or airport authority) would have the responsibility of mitigating these impacts. Vigorous water application during ground-disturbing activities would mitigate fugitive dust emissions by at least 50 percent (U.S. EPA, 1985). Decreasing the time period during which newly graded sites are exposed to the elements would further mitigate fugitive dust emissions by some factor directly related to the reduction in exposure time. Combustive emission impacts could be mitigated by efficient scheduling of equipment use, implementing a phased construction schedule to reduce the number of units operating simultaneously, and performing regular vehicle engine maintenance. The amount of emission reduction provided by these measures is not known with certainty because of the potential variables in scheduling. However, it is estimated that implementation of these measures would substantially reduce combustive emissions and air quality effects from construction activities associated with the Proposed Action by 10 to 25 percent. In addition, all aviation development during the construction phase would comply with measures contained in the *FAA Standards for Specifying Construction of Airports* (FAA, 1990).

Air quality operational mitigation measures and offset purchases would be necessary to eliminate any interference with attainment and maintenance of the CAAQS and NAAQS due to increased emissions from the Proposed Action. As previously discussed, mitigations and offsets will therefore be required to eliminate emission increases of NO_x, ROG, and PM_{10}. Mitigation measures would have to be developed by the project proponent (the redevelopment agency or the airport authority). These measures would have to be coordinated with the SBCAPCD and the ARB in order to ensure consistency with local and/or regional air quality attainment plans.

Potential mitigation measures would most likely focus on some type of land use or transportation planning and management measures to reduce motor vehicle

pollution. The purpose of the measures would be to reduce vehicle miles travelled, vehicle trips, and peak hour travel. These reductions would, therefore, reduce both regional and localized vehicle-related emissions of NO_x, ROG, and PM_{10}.

The types of operational mitigation measures that could be implemented include: (1) development of a comprehensive airport shuttle system to reduce personal vehicle use; (2) use of off-site parking and parking lot shuttles for long-term parking needs; (3) development of a light rail or trolly (electric) transportation system to service the airport; (4) promotion of carpools and vanpools by providing a rider matching service, preferential parking and financial incentives; (5) financial incentives to encourage the use of public transit; (6) improvements such as bicycle lanes, storage facilities and showers to increase the use of bicycling as a mode of transportation; and (7) on-site location of facilities that would reduce the need for off-site travel (e.g., childcare facilities, cafeterias, postal machines, automated tellers, etc.).

The amount of emission reduction achieved would depend on the particular mitigation measures selected. Emissions remaining after application of all practicable mitigation measures would have to be offset by reducing similar pollutant emissions from other area sources by a ratio greater than one for one. Emission offsets are generally obtained by methods such as: (1) direct purchase and shutdown of an emitting source; (2) installation on existing sources of new or additional control equipment beyond that which is currently required by regulation; and (3) innovative and non-traditional methods such as construction of bus shelters to induce increased mass transit ridership, buying and removing from service older model on-road vehicles, or paving of unpaved parking and road areas to reduce particulate emissions.

The SBCAPCD recently proposed New Source Review (NSR) regulations that would establish a system for acquiring, banking, and transferring air emission reduction credits. These rules are expected to be approved by EPA in 1992.

NSR is a process used to determine whether the construction or modification of stationary sources of air pollutant emissions will interfere with attainment or maintenance of a NAAQS. A major new source or major modification to an existing source located in a nonattainment area for a pollutant to be emitted by the proposed source or modification would be required to obtain offsetting emission reductions for the pollutant or its precursors prior to construction or modification.

Offsetting emission reductions, or emission reduction credits, can be obtained by the shutdown or permanent curtailment of emissions of the applicable pollutants from existing sources. Under the SBCAPCD proposed rules, owners of existing stationary sources that permanently shutdown or curtail operations may apply for emission reduction credit certificates. The owner must apply

within 90 days after shutdown or curtailment and must provide the necessary emissions calculation data. Emission reduction credits that become available due to the failure of the owner of the emitting facility to timely file for the certificates would be forfeited. The amount of emission reduction credits received will depend on whether the emitting source employed reasonably available control technology (RACT). RACT is technology required by Section 172 of the Clean Air Act to be installed on existing major sources in nonattainment areas and reflects controls identified in EPA guidance to the states as necessary in ozone nonattainment areas. If the unit employed RACT, the available ERCs equal the actual reduction in emissions. If RACT was not used prior to shutdown or curtailment, the available ERCs equal the amount of emissions that would have been emitted if the unit had operated with RACT.

The ERC certificates may be used, held for later use, or transferred in whole or in part. When eventually used to offset emission increases from a new or modified stationary source, a penalty in the form of varying offset ratios (ratio of ERCs to increased emissions from a new or modified source) may be imposed depending on the distance of the new or modified source from the shutdown or curtailed source that generated the ERC. The following table lists the offset ratios based on location of the new or modified source requiring the offset from the shutdown or curtailed source:

Location	Offset Ratio
Within the same source	1 to 1
Within 15 miles of the source	1.2 to 1
15 to 49 miles of the source and within air basin	1.5 to 1
50 to 100 miles, and within air basin	2.0 to 1
More than 100 miles, and within air basin	3.0 to 1

The SBCAPCD will use the ERC program as part of its Air Quality Attainment Plan to reduce overall air emissions and attain compliance with the state and federal air quality standards. As described above, the ERC program obtains reductions in overall emissions by imposing a RACT forfeiture and offset penalties.

The permanent shutdown or curtailment of existing stationary sources of air pollutants at George AFB could result in a significant amount of available ERCs for precursors to ozone and a moderate amount of ERCs for PM_{10}. Due to the RACT forfeiture and offset penalties associated with ERCs, the permanent shutdown or curtailment of all or a portion of existing stationary sources at George AFB could contribute to reductions in overall emissions within the district. The extent of impact would depend on how the reuse and development activities are subject to NSR and where they obtain any necessary emission

reduction offsets prior to construction or modification of major sources of air pollutant emissions.

Transfer or conveyance, without permanent shutdown or curtailment, of existing emitting sources at George AFB to reuse organizations would not result in accumulation of ERCs for those sources. A change of ownership of the sources without permanent shutdown or curtailment of emissions would require the new owner to apply to the SBCAPCD for a permit to operate. The new owner would not be subject to NSR requirements so long as the new owner proposed to operate the existing emitting source without modification or change in operating conditions. Under those circumstances, the application for a new permit to operate would serve as a temporary permit for operation of the existing emitting source.

Emission offsets are often difficult to obtain and may require a large commitment of time and money in order to do so. As was the case for mitigation measures, the future project proponent must therefore establish a dialogue with the SBCAPCD and the ARB well in advance of project initiation in order to ensure that the necessary amount of offsets will be established, found, and properly credited.

4.4.3.2 International Airport Alternative. The primary difference between this alternative and the Proposed Action is the size of the aircraft operations. The large airfield, airport, and aviation support areas associated with the International Airport operations would increase the amount of air traffic and population-related emissions.

Construction. Construction impacts from this alternative would be greater than under the Proposed Action because of the large amount of development needed for the airport and aviation-support areas. It is estimated that a total of 7,087 acres will be disturbed by construction over the 20-year period of project development. Approximately 354 acres would be disturbed at any one time during this period, resulting in unmitigated particulate matter emissions of 425 tons per month (213 tons per month of PM_{10}). The impact of these emissions would cause elevated concentrations of particulates at receptors close to the construction areas. The concentrations would fall off rapidly with distance from the construction areas.

Operation. Table 4.4-12 summarizes the results of the emission calculations for the International Airport Alternative for the 5, 10, and 20 year increments (i.e., for the years 1998, 2003, and 2013, respectively). Emissions for the year 2013 increase substantially over the year 2003 emissions, particularly in the case of NO_x, ROG, and CO. These large increases are a result of the large number of aircraft operations occurring in the year 2013, which causes queuing to take place on the taxiways prior to takeoff. Queue length and queue time increase as a function of the number of planes attempting to take off during any given

Table 4.4-12. Pollutant Emissions Associated with the International Airport Alternative (tons/day)

Pollutant	Attainment Level	1987 Emissions Inventory Amount [a]	1998	2003	2013
NO_x	94[b]	134	7.31	12.98	47.67
ROG	35[b]	50	3.53	3.99	52.51
PM_{10}	57[c]	100	1.89	15.44	25.99
SO_2	275[d]	11	0.42	2.72	6.49
CO	560[d]	190	13.32	29.14	181.13

Notes: (a) Emissions are from the San Bernardino County portion of the Southeast Desert Basin (ARB, 1990; SBCAPCD, 1991).
(b) Area currently in nonattainment of ozone standard. Attainment projected to occur in 1994 (SBCAPCD, 1991).
(c) Area currently in nonattainment of PM_{10} standards. Projected attainment date unknown. SBCAPCD currently preparing attainment plans for this pollutant.
(d) Area currently attaining standards for this pollutant.

time period; queue times of up to 50 minutes can be experienced during peak takeoff hours. Large amounts of emissions are released as the aircraft wait in the takeoff queue. Queuing emissions account for 14.8 percent of the total NO_x emissions from all emission source categories combined (refer to Appendix I.), 68.5 percent of total CO emissions, and 81.0 percent of total ROG emissions. This table also provides a comparison of the magnitude of the reuse-related emissions in relation to the attainment level (the basin-wide level of emissions above which the area would be in nonattainment) and the 1987 emission inventory amount for the San Bernardino County portion of the SEDAB.

These results show that emissions of NO_x, ROG, and PM_{10} could interfere with the process of reaching and maintaining attainment of the CAAQS and NAAQS. All NO_x, ROG, and PM_{10} emissions associated with the International Airport Alternative will therefore have to be mitigated to the fullest extent possible, and the portions remaining after mitigation will have to be fully offset by reducing emissions of these pollutants from other sources in the area. Section 4.4.3.1 (Regional Scale) provides a discussion of the PSD program currently administered by EPA in San Bernardino County.

Most of the SO_2 and CO emissions associated with the International Airport Alternative and alternatives would arise from mobile sources. Because mobile sources do not trigger PSD analysis, and CO is not covered by PSD at all, this analysis examines the potential for these emissions to cause a nonattainment situation at some future time.

Table 4.4-12 summarizes the calculated emission rates for SO_2 and CO and also provides a comparison of the magnitude of the reuse-related emissions in relation to the estimated attainment levels for the two pollutants. These results indicate that the International Airport Alternative emissions of SO_2 and CO

would not be sufficient to jeopardize the attainment status for these pollutants. Current baseline emissions in the basin are well below the levels which would cause nonattainment, and the International Airport Alternative emissions (with the exception of year 2013 CO emissions) are only a small fraction of the baseline. In addition, long-term emission trends prepared by the EPA indicate that both SO_2 and CO emissions are declining throughout the nation and will continue to decline (U.S. EPA, 1991). The large amount of CO emissions associated with the International Airport Alternative in the year 2013 is primarily due to increased traffic congestion and queueing of aircraft during peak operational hours. The CO ton per day amount is nearly equivalent to the entire 1987 baseline emissions for the basin. Nonetheless, current baseline emissions are so low that the addition of the project CO emissions to the baseline would still not exceed the estimated attainment level of emissions.

The impacts of emissions associated with operation of the International Airport Alternative were assessed by use of the Emissions and Dispersion Modeling System. Included in the modeling were peak hour scenarios for both aircraft operations and vehicle traffic serving the airport. Meteorological conditions and other parameters input into the model were the same as previously described for the modeling of the Proposed Action. EPA conversion factors were used to convert the model-predicted 1-hour impacts to conservative screening-level estimates of longer averaging period concentrations (U.S. EPA, 1977). The actual long-term averages would be less than the values produced by use of the conversion factors.

A summary of the EDMS analysis is presented in Table 4.4-13. The results show that for a peak hour airport operation scenario, two high concentration locations would be produced. The maximum 1-hour CO pollutant concentration would occur at a receptor located along the airport property boundary approximately 5,000 feet downwind from the main terminal roadway. The primary contribution to the impact at this location is from on-road vehicle exhaust. Maximum impact for all other pollutants occurred at a receptor located on the property line approximately 11,250 feet downwind from the south end of the north-south runway. The primary contribution to the impact at this location is from aircraft exhaust emitted during takeoffs.

The modeling results indicate that NO_2 concentrations would exceed standards in the immediate area surrounding the airport, in particular, that area extending from the ends of the runways. NO_2 1-hour concentrations would exceed standards during each modeled year of the project, but would get progressively worse until concentrations in the year 2013 were approximately three times higher than the CAAQS. Emissions of SO_2 and PM_{10} would cause exceedance of the CAAQS and NAAQS beginning sometime between the years 2003 and 2013. Emissions and concentrations increase dramatically when the airport begins to reach capacity during this time period and traffic congestion and aircraft queueing on the runways begins to occur.

Table 4.4-13. Air Quality Modeling Results for the International Airport Alternative ($\mu g/m^3$)

Pollutant	Averaging Time	Project Impact[a] 1998	2003	2013	Background Concentration[b]	Limiting Standard[c]
CO	8-hour	2,150	2,702	5,432	4,500	10,000
	1-hour	3,072	3,860	7,760	7,424	40,000
NO_2[c]	Annual	31	79	156	25	100
	1-hour	310	497	1,271	172	470
SO_2	Annual	1	5	150	5	80
	24-hour	6	19	598	47	131
	3-hour	13	43	1,346	121	1,300
	1-hour	14	48	1,496	121	655
PM_{10}	Annual (geometric)	0.2	0.6	98	44.1	30
	Annual (arithmetic)	0.2	0.6	98	48.1	50
	24-hour	0.7	2.4	394	112	150

Notes: (a) The maximum 1-hour CO pollutant concentration would occur at a receptor located along the airport property boundary approximately 5,000 feet downwind from the main terminal roadway. Maximum impact for all other pollutants occurred at a receptor located on the property line approximately 11,250 feet downwind from the south end of the north-south runway.

(b) Background concentrations assumed to equal the mean of first-high values monitored at the Victorville, Phelan, and Hesperia monitoring stations during 1987 to 1989.

(c) Nitrogen dioxide impact concentrations calculated by use of the ozone limiting method of Cole and Summerhays (1979). Ten percent of NO_x assumed to be thermally converted to NO_2. Conversion of the remainder of NO_x to NO_2 is limited by the background concentration of ozone. Background ozone concentrations assumed to equal the mean of first-high values monitored at the Victorville, Phelan, and Hesperia monitoring stations during 1987 to 1989: 1-hour ozone background = 408 $\mu g/m^3$; annual ozone background = 70 $\mu g/m^3$.

Cumulative Impacts. Cumulative impacts are the same as those provided for the Proposed Action.

Mitigation Measures. Mitigation measures and offset purchases are the same as those recommended for the Proposed Action (Section 4.4.3.1).

4.4.3.3 Commercial Airport with Residential Alternative. This alternative differs from the Proposed Action in that approximately 2,000 acres of land are used for residential areas rather than for aviation support, commercial and industrial uses. Also, unlike the Proposed Action, the airfield area is not expanded under this alternative. However, the number and type of aircraft operations is assumed to remain the same as for the Proposed Action.

Construction. Construction impacts for this alternative would be less than for the Proposed Action because of reduced disturbance in the airfield and aviation support areas. It is estimated that a total of 2,568 acres will be disturbed over the 20-year life of the project. Approximately 128 acres would be disturbed at any one time during this period resulting in unmitigated particulate matter emissions of 154 tons per month (77 tons per month of PM_{10}). The impact of

these emissions would cause elevated concentrations of particulate at receptors located close to the construction areas. However, the elevated concentrations would be a temporary effect that would rapidly decrease with distance from the construction areas.

Operation. Table 4.4-14 summarizes the results of the emission calculations for the Commercial Airport with Residential Alternative for 0, 5, 10, and 20 year increments after closure (i.e., for the years 1993, 1998, 2003, and 2013, respectively). This table also provides a comparison of the magnitude of the reuse-related emissions in relation to the attainment level (the basin-wide level of emissions above which the area would be in nonattainment) and the 1987 emission inventory amount for the San Bernardino County portion of the SEDAB.

Table 4.4-14. Pollutant Emissions Associated with the Commercial Airport with Residential Alternative (tons/day)

Pollutant	Attainment Level	1987 Emissions Inventory Amount [a]	1993	1998	2003	2013
NO_x	94 [b]	134	1.05	2.61	3.54	4.54
ROG	35 [b]	50	0.33	0.95	1.23	1.42
PM_{10}	57 [c]	100	0.03	2.18	3.71	5.98
SO_2	275 [d]	11	0.06	0.32	0.48	0.73
CO	560 [d]	190	1.00	5.05	7.23	10.80

Notes: (a) Emissions are from the San Bernardino County portion of the Southeast Desert Basin (ARB, 1990; SBCAPCD, 1991).
(b) Area currently in nonattainment of ozone standard. Attainment projected to occur in 1994 (SBCAPCD, 1991).
(c) Area currently in nonattainment of PM_{10} standards. Projected attainment date unknown. SBCAPCD currently preparing attainment plans for this pollutant.
(d) Area currently attaining standards for this pollutant.

These results show that emissions of NO_x, ROG, and PM_{10}, although relatively small in comparison to baseline inventory amounts, could interfere with the process of reaching and maintaining attainment of the CAAQS and NAAQS. All NO_x, ROG, and PM_{10} emissions associated with the Commercial Airport with Residential Alternative would, therefore, have to be mitigated to the fullest extent possible, and the portions remaining after mitigation offset by reducing emissions of these pollutants from other sources in the area. Section 4.4.3.1 (Regional Scale) provides a discussion of the PSD program currently administerd by EPA in San Bernardino County.

Table 4.4-14 summarizes the calculated emission rates for SO_2 and CO and also provides a comparison of the magnitude of the reuse-related emissions in relation to the estimated attainment levels for the two pollutants. These results indicate that the Commercial Airport with Residential Alternative emissions of SO_2 and CO would not be sufficient to jeopardize the attainment status for these pollutants. Current baseline emissions in the basin are well below the levels

which would cause nonattainment, and the Commercial Airport with Residential Alternative emissions are only a small fraction of the baseline. In addition, long-term emission trends prepared by the EPA indicate that both SO_2 and CO emissions are declining throughout the nation and will continue to decline (U.S. EPA, 1991).

The impacts of emissions associated with operation of the airport under this alternative were assessed by use of the Emissions and Dispersion Modeling System. The airport operations for this alternative are assumed to be the same as for the Proposed Action. Therefore, all inputs and results for this alternative are the same as previously described for the modeling of the Proposed Action. Please refer to Section 4.4.3.1 for a description of the results.

Cumulative Impacts. No other projects have been identified that would cause adverse cumulative air quality impacts as a result of development of the Commercial Airport with Residential Alternative.

Mitigation Measures. Mitigation measures and offset purchases are the same as those recommended for the Proposed Action (Section 4.4.3.1).

4.4.3.4 General Aviation Center Alternative. The General Aviation Center Alternative would convert the existing airfield and aviation support areas to private aviation use. The airfield activity and number of annual flights associated with this alternative would be lower than under the Proposed Action. A minimal amount of new construction is proposed under this alternative, and approximately 50 percent of the base would remain vacant.

Construction. Some fugitive dust and combustive emissions would be generated during activities associated with construction of new aviation support facilities and renovation of buildings in the commercial and residential land use areas. It is estimated that a total of only 220 acres will be disturbed by construction during the life of this project alternative. An average of 11 acres would be disturbed at any one time, resulting in an unmitigated amount of particulate matter emissions equal to 13 tons per month (6.5 tons per month of PM_{10}). The impact of these emissions would cause elevated short-term concentrations of particulates at receptors close to the construction areas. However, the elevated concentrations would be a temporary effect that would fall off rapidly with distance.

Operation. Table 4.4-15 summarizes the results of the emission calculations for the General Aviation Center Alternative. This table also provides a comparison of the magnitude of the reuse-related emissions in relation to the attainment level (the basin-wide level of emissions above which the area would be in nonattainment) and the 1987 emission inventory amount for the San Bernardino County portion of the SEDAB.

Table 4.4-15. Pollutant Emissions Associated with the General Aviation Center Alternative (tons/day)

Pollutant	Attainment Level	1987 Emissions Inventory Amount [a]	1998	2003	2013
NO_x	94[b]	134	1.38	1.73	1.71
ROG	35[b]	50	0.60	0.54	0.66
PM_{10}	57[c]	100	2.43	3.30	3.60
SO_2	275[d]	11	0.25	0.35	0.39
CO	560[d]	190	3.72	4.86	5.38

Notes: (a) Emissions are from the San Bernardino County portion of the Southeast Desert Basin (ARB, 1990; SBCAPCD, 1991).
(b) Area currently in nonattainment of ozone standard. Attainment projected to occur in 1994 (SBCAPCD, 1991).
(c) Area currently in nonattainment of PM_{10} standards. Projected attainment date unknown. SBCAPCD currently preparing attainment plans for this pollutant.
(d) Area currently attaining standards for this pollutant.

These results show that emissions of NO_x, ROG, and PM_{10}, although relatively small in comparison to baseline inventory amounts, could interfere with the process of reaching and maintaining attainment of the CAAQS and NAAQS. All NO_x, ROG, and PM_{10} emissions associated with the General Aviation Center Alternative would therefore have to be mitigated to the fullest extent possible, and the portions remaining after mitigation offset by reducing emissions of these pollutants from other sources in the area.

Section 4.4.3.1 (Regional Scale) provides a discussion of the PSD program currently administerd by EPA in San Bernardino County.

Table 4.4-15 summarizes the calculated emission rates for SO_2 and CO and also provides a comparison of the magnitude of the reuse-related emissions in relation to the estimated attainment levels for the two pollutants. These results indicate that the General Aviation Center Alternative emissions of SO_2 and CO would not be sufficient to jeopardize the attainment status for these pollutants. Current baseline emissions in the basin are well below the levels which would cause nonattainment, and the General Aviation Center Alternative emissions are only a small fraction of the baseline. In addition, long-term emission trends prepared by the EPA indicate that both SO_2 and CO emissions are declining throughout the nation and will continue to decline (U.S. EPA, 1991).

The impacts of emissions associated with operation of the airport under this alternative are expected to be similar, albeit somewhat less, than the impacts associated with the Proposed Action. The maximum amount of aircraft operations under the Proposed Action scenario is 76,000 while the maximum number for the General Aviation Center Alternative is 54,000. (Refer to Section 4.4.3.1 for a description of the results of the Proposed Action modeling and impacts.)

Cumulative Impacts. No other projects have been identified that would cause adverse cumulative air quality impacts with this alternative. The proposed SST would provide beneficial air quality impacts by reducing the amount of emissions associated with vehicle transport of spectators to and from the airport during air shows.

Mitigation Measures. Mitigation measures and offset purchases are the same as those recommended for the Proposed Action (Section 4.4.3.1).

4.4.3.5 Non-Aviation Alternative. The Non-Aviation Alternative would eliminate the airfield and aviation support areas and convert the base property to entirely industrial, institutional, commercial, residential, and recreational uses.

Construction. Construction impacts for this alternative would be approximately the same as those for the Proposed Action. It is estimated that a total of 3,762 acres will be disturbed by construction during the life of this project alternative. Approximately 188 acres would be disturbed at any point in time during this period, resulting in unmitigated particulate matter emissions of 226 tons per month (113 tons per month of PM_{10}). The impact of these emissions would cause elevated concentrations of particulates at receptors located close to the construction areas. However, the elevated concentrations would be a temporary effect the would rapidly decrease with distance from the construction areas.

Operation. Table 4.4-16 summarizes the results of the emission calculations for the Non-Aviation Alternative. This table also provides a comparison of the magnitude of the reuse-related emissions in relation to the attainment level (the basin-wide level of emissions above which the area would be in nonattainment) and the 1987 emission inventory amount for the San Bernardino County portion of the SEDAB.

Table 4.4-16. Pollutant Emissions Associated with the Non-Aviation Alternative (tons/day)

Pollutant	Attainment Level	1987 Emissions Inventory Amount [a]	1998	2003	2013
NO_x	94[b]	134	0.78	1.23	2.04
ROG	35[b]	50	0.32	0.51	0.81
PM_{10}	57[c]	100	1.31	2.40	5.25
SO_2	275[d]	11	0.14	0.25	0.55
CO	560[d]	190	1.78	3.02	6.67

Notes: (a) Emissions are from the San Bernardino County portion of the Southeast Desert Basin (ARB, 1990; SBCAPCD, 1991).
(b) Area currently in nonattainment of ozone standard. Attainment projected to occur in 1994 (SBCAPCD, 1991).
(c) Area currently in nonattainment of PM_{10} standards. Projected attainment date unknown. SBCAPCD currently preparing attainment plans for this pollutant.
(d) Area currently attaining standards for this pollutant.

Section 4.4.3.1 (Regional Scale) provides a discussion of the PSD program currently administerd by EPA in San Bernardino County.
Table 4.4-16 summarizes the calculated emission rates for SO_2 and CO and also provides a comparison of the magnitude of the reuse-related emissions in relation to the estimated attainment levels for the two pollutants. These results indicate that the Non-Aviation Alternative emissions of SO_2 and CO would not be sufficient to jeopardize the attainment status for these pollutants. Current baseline emissions in the basin are well below the levels which would cause nonattainment, and the Non-Aviation Alternative emissions are only a small fraction of the baseline. In addition, long-term emission trends prepared by the EPA indicate that both SO_2 and CO emissions are declining throughout the nation and will continue to decline (U.S. EPA, 1991).

Cumulative Impacts. No other projects have been identified that would cause adverse cumulative air quality impacts as a result of the Non-Aviation Alternative.

Mitigation Measures. Mitigation measures and offset purchases are the same as those recommended for the Proposed Action (Section 4.4.3.1).

4.4.3.6. Other Land Use Concepts. Several federal transfers and independent land use concepts have been identified, as described in Section 2.3.5. Implementation of these reuse proposals is assumed to be in conjunction with that of the Proposed Action or alternatives. Potential changes in air quality resulting from implementation of one or more of the federal transfers and land use concepts are described below.

U.S. Department of Justice. The complex would generate some additional air emissions associated with heating and power requirements, and mobile source emissions related to vehicle traffic generated by employees and service vehicles. The amount of emissions would be small compared to total emissions associated with full implementation of the Proposed Action or alternatives.

U.S. Department of Interior. This transfer could cause some slight increase in emissions over the amount associated with facility use during preclosure conditions if the number of facility users increases. Additional users from the community would generate an increase in vehicle traffic to and from the recreational facilities.

U.S. Department of Housing and Urban Development. This transfer would not create additional air emissions, and may reduce emissions slightly if the number of vehicles owned by the low-income and homeless tenants is less than the number that would be present under circumstances of general population occupation.

U.S. Department of Transportation. This transfer would have no impact on air quality.

U.S. Department of Education. Transfer of these facilities and properties would have beneficial effects on air quality because the presence of local educational facilities would reduce vehicle travel for the residents living in the area.

San Bernardino County Work Furlough Program. Slight increases in air emissions could be associated with this conveyance, depending on the number of employees required and related vehicle-miles of travel.

Medical Facilities. Increases in air emissions could be associated with this transfer, depending on the number of employees required, the number of patients/students accommodated, and related vehicle-miles of travel.

4.4.3.7 No-Action Alternative. The No-Action Alternative would not require further use of the base after closure. The Air Force would place the base in a caretaker status intended to minimize deterioration of the existing utilities and structures. There would be no active uses of the property.

The No-Action Alternative would have no adverse impact on air quality. Air quality conditions at the time of closure may not be affected by continued maintenance of the base at the closure level of activity. In fact, there may be some level of air quality benefit associated with maintaining the base at a reduced level of activity compared to the levels of activity associated with either the Proposed Action or reuse alternatives.

Cumulative Impacts. There are no other projects currently planned for the George AFB area that would have a cumulative air quality impact as a result of the No-Action Alternative.

Mitigation Measures. Air quality mitigation measures are not required for the No-Action Alternative because there are no significant impacts associated with this alternative.

4.4.4 Noise

Environmental impact analysis related to noise includes the potential effects on the local human and animal populations. This analysis will estimate the extent and magnitude of noise levels generated by the Proposed Action and alternatives, using the predictive models discussed below. The baseline noise conditions and predicted noise levels will then be assessed with respect to potential annoyance, speech interference, sleep disturbance, hearing loss, health and land-use impacts.

Methods used to quantify the effects of noise such as annoyance, speech interference, sleep disturbance, health and hearing loss have undergone extensive scientific development during the past several decades. The most

current and reliable measures are noise-induced hearing loss and annoyance. Extra-auditory effects (those not directly related to hearing capability) are also important, although they are not as well understood. The current scientific consensus is that "evidence from available research reports is suggestive, but it does not provide definitive answers to the question of health effects, other than to the auditory system, of long-term exposure to noise" (National Academy of Sciences, 1981). The effects of noise are summarized within this section and a detailed description is provided in Appendix J.

Annoyance. Noise annoyance is defined by the EPA as any negative subjective reaction to noise on the part of an individual or group. Table 4.4-17 presents the results of over a dozen studies of transportation modes, including airports, investigating the relationship between noise and annoyance levels.

Table 4.4-17. Percentage of Population Highly Annoyed by Noise Exposure

DNL Interval	Percentage of Persons Highly Annoyed
<65	<15
65-70	15-25
70-75	25-37
75-80	37-52

Source: Adapted from National Academy of Sciences, 1977.

This relationship has been suggested by the National Academy of Sciences (NAS, 1977) and recently re-evaluated (Fidell et al., 1989) for use in describing peoples' reaction to semi-continuous (transportation) noise. These data are shown to provide a perspective on the level of annoyance that might be anticipated. For example, 15 to 25 percent of persons exposed to DNL of 65 to 70 dB would be highly annoyed by the noise levels.

Speech Interference. One of the ways that noise affects daily life is by prevention or impairment of speech communication. In a noisy environment, understanding speech is diminished when speech signals are masked by intruding noises. Reduced intelligibility of speech may also have other effects; for example, if the understanding of speech is interrupted, performance may be reduced, annoyance may increase, and learning may be impaired. Research suggests that aircraft flyover noises that exceed approximately 60 dB interfere with speech communication. Increasing the level of the flyover noise maximum to 80 dB will reduce the intelligibility to zero, even if the person speaks in a loud voice.

Sleep Interference. The effects of noise on sleep are of concern, primarily in assuring suitable residential environments. Early studies suggest that various noise levels between 25 and 50 dBA were associated with an absence of sleep background disturbance. Because no known health effects were associated

with either waking or sleep-stage changes, either of which was potentially useful as a descriptor of sleep disturbance.

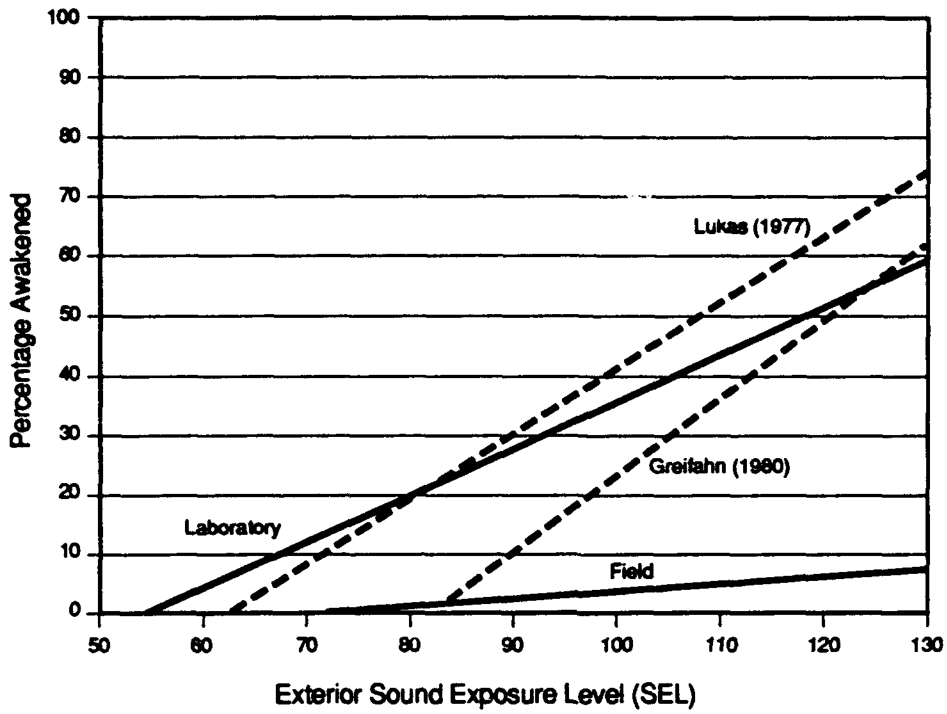
The noise descriptor that may best describe the effect of noise on sleep is the SEL. The SEL takes into account an event's sound intensity, frequency content, and time duration, by measuring the total A-weighted sound energy of the event and incorporating it into a single number. Unlike DNL, which describes the daily average noise exposure, SEL describes the normalized noise from a single flyover, called an event.

Studies (Lukas, 1975; Goldstein and Lukas, 1980) show great variability in the percentage of people awakened by exposure to noise. A recent review (Pearsons et al., 1989) of the literature related to sleep disturbance, including field as well as laboratory studies, suggests that habituation may reduce the effect of noise on sleep. The authors point out that the relationship between noise exposure and sleep disturbance is complex and affected by the interaction of many variables. The large differences between the findings of the laboratory and field studies make it difficult to determine the best relationship to use. The method developed by Lukas would estimate seven times more awakening than the field results reported by Pearsons.

The relationships between percent awakened and SEL are presented in Figure 4.4-6. These relationships consider the sound attenuation provided by a residential building with the windows open. Appendix J contains further information on the derivation.

Hearing Loss. Hearing loss is measured in decibels and refers to a permanent auditory threshold shift of an individual's hearing in an ear. The EPA (EPA, 1974) has recommended a limiting daily energy value of Leq 70 dBA to protect against hearing impairment over a period of 40 years. This daily energy average would translate into a DNL value of approximately 75 dBA or greater. Based on EPA recommendations (U.S. EPA, 1974), hearing loss is not expected in people exposed to 75 DNL or less.

Health. Research investigating the relationship between noise and adverse extra-auditory health effects have been inconclusive. Alleged extra-auditory health consequences of noise exposure which have been studied include birth defects, psychological illness, cancer, stroke, hypertension and cardiac illnesses. Although hypertension appears to be the most biologically plausible of these consequences, studies addressing this issue have failed to provide adequate support. Studies that have found negative consequences have failed to be replicated, thereby questioning the validity of those studies (Frerichs et al., 1980; Anton-Guirgis et al., 1986). Studies that have controlled for multiple factors have shown no, or very weak, associations between noise exposure and extra-auditory effects (Thompson and Fidell, 1989). The current state of technical knowledge cannot support inference of a causal or consistent



Source: Pearsons, 1989.

Sleep Disruption (Awakening)

Figure 4.4-6

relationship, nor a quantitative dose-response, between residential aircraft noise exposure and health consequences.

Animals. Literature concerning the effects of noise on animals is not large, and most of the studies have focused on the relation between dosages of continuous noise and effects (Belanovskii and Omel'yanenko, 1982; Ames, 1974). A review of 209 claims pertinent to aircraft noise spanning a 32-year period suggested that economic loss was small, that the major source of loss was panic induced in naive animals, and that experimental literature is inadequate to document long-term or subtle effects (Bowles et al., 1990). No controlled study has documented any serious accident or mortality on livestock, despite extreme exposure to noise.

Land Use Compatibility. Estimates of total noise exposure resulting from aircraft operations, as expressed using DNL, can be interpreted in terms of the compatibility with designated land uses. The Federal Interagency Committee on Urban Noise developed land-use compatibility guidelines for noise (USDOT, 1980). Based upon these guidelines, suggested compatibility guidelines for evaluating land uses in aircraft noise exposure areas were developed by the FAA and are presented in Section 3.4.4. The land use compatibility guidelines are based on annoyance and hearing loss considerations previously described. Part 150 of the FAA regulations describes the procedures, standards and methodology governing the development, submission and review of airport noise exposure maps and airport noise compatibility programs. It describes the use of yearly DNL in the evaluation of airport noise environments. It also identifies those land-use types that are normally compatible with various levels of exposure. Compatible or incompatible land use is determined by comparing the predicted DNL level at a site with the recommended land uses.

Noise Modeling. In order to define the noise impacts from aircraft operations at George AFB, the FAA approved Noise Exposure Model (NOISEMAP) version 6.0 which was utilized to predict 65, 70, and 75 DNL noise contours and SEL values for noise-sensitive receptors. Appendix J defines these descriptors. The contours were generated for the Proposed Action for the baseline year (1993) and three future year projections (1998, 2003, and 2013), and for the International Airport Alternative and General Aviation Center Alternative for three future year projections (1998, 2003, and 2013). These contours were overlaid on a U.S. Geological Survey (USGS) map of the base and vicinity. Input data to NOISEMAP include information on aircraft types; runway use; takeoff and landing flight tracks; aircraft altitude, speeds, and engine power settings; and number of daytime (7 a.m. to 10 p.m.) and nighttime (10 p.m. to 7 a.m.) operations.

Surface vehicle traffic-noise levels for roadways in the vicinity of George AFB were analyzed using the FHWA's Highway Noise Model (FHWA, 1978). This

model incorporates vehicle mix, traffic volume projections and speed to generate DNL.

Major Assumptions. Half of all aircraft operations were assumed to be takeoffs and half were landings. Aircraft operations and mix are included in Appendix J. All operations were assumed to follow standard glide slopes and takeoff profiles provided by the model.

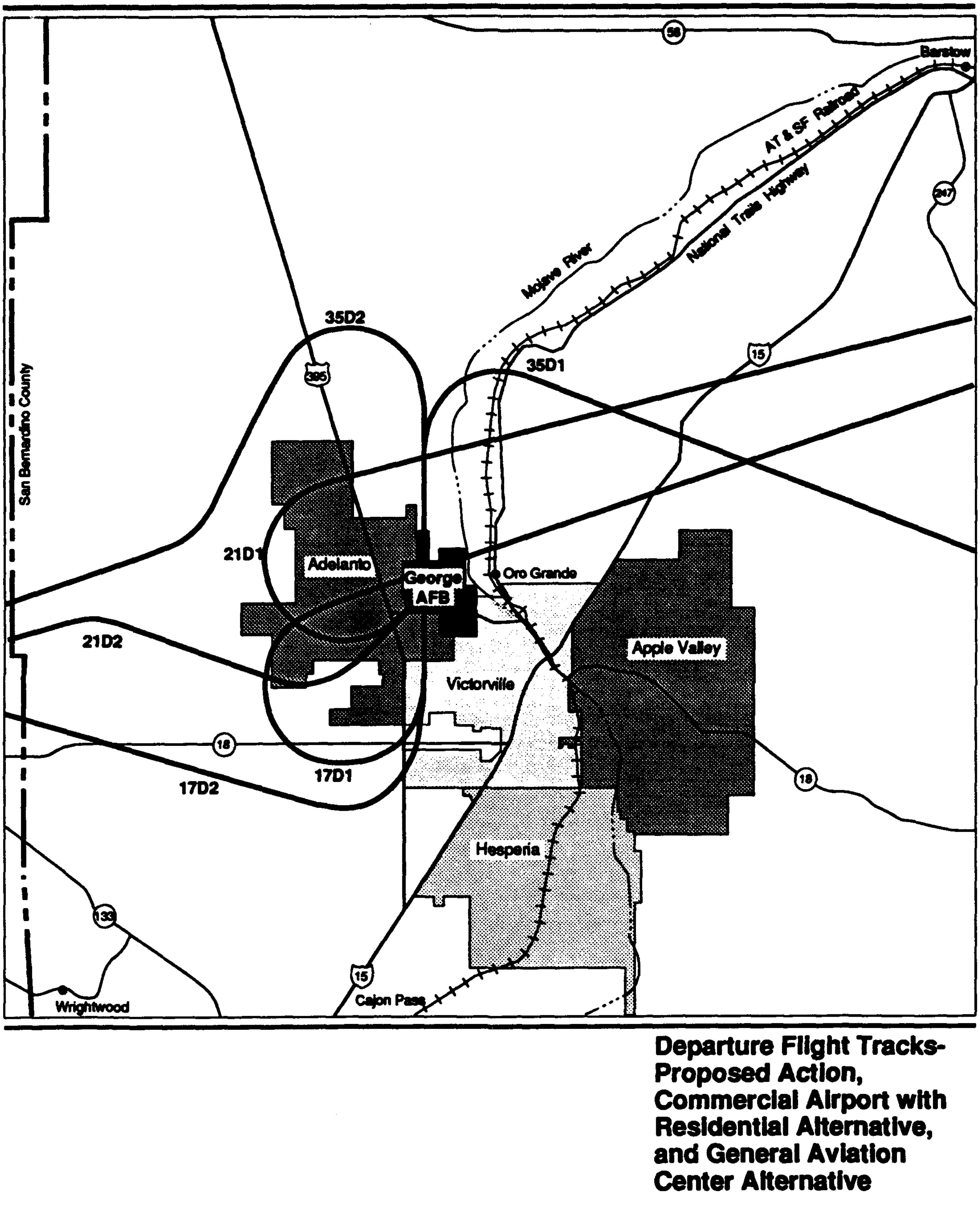
Major roads leading to or around the base were analyzed. Traffic data used to project future noise levels were derived from information gathered in the traffic study presented in Section 4.2.3. Traffic data used in this analysis are presented in Appendix J.

4.4.4.1 Proposed Action. Figures 4.4-7 through 4.4-9 outline the flight tracks for the Proposed Action. The results of the aircraft noise modeling for the Proposed Action are presented as noise contours in Figures 4.4-10 through 4.4-13, for the years 1993, 1998, 2003, and 2013, respectively. Table 4.4-18 presents the area and population affected by the Proposed Action air traffic noise by each representative year. The Proposed Action is estimated to expose approximately 552 acres and no people to a DNL of 65 dB or greater in the year 1993. This is estimated to reach approximately 920 acres and no people by the year 2013.

Table 4.4-18. Noise Exposure for the George AFB Alternative Development Plans

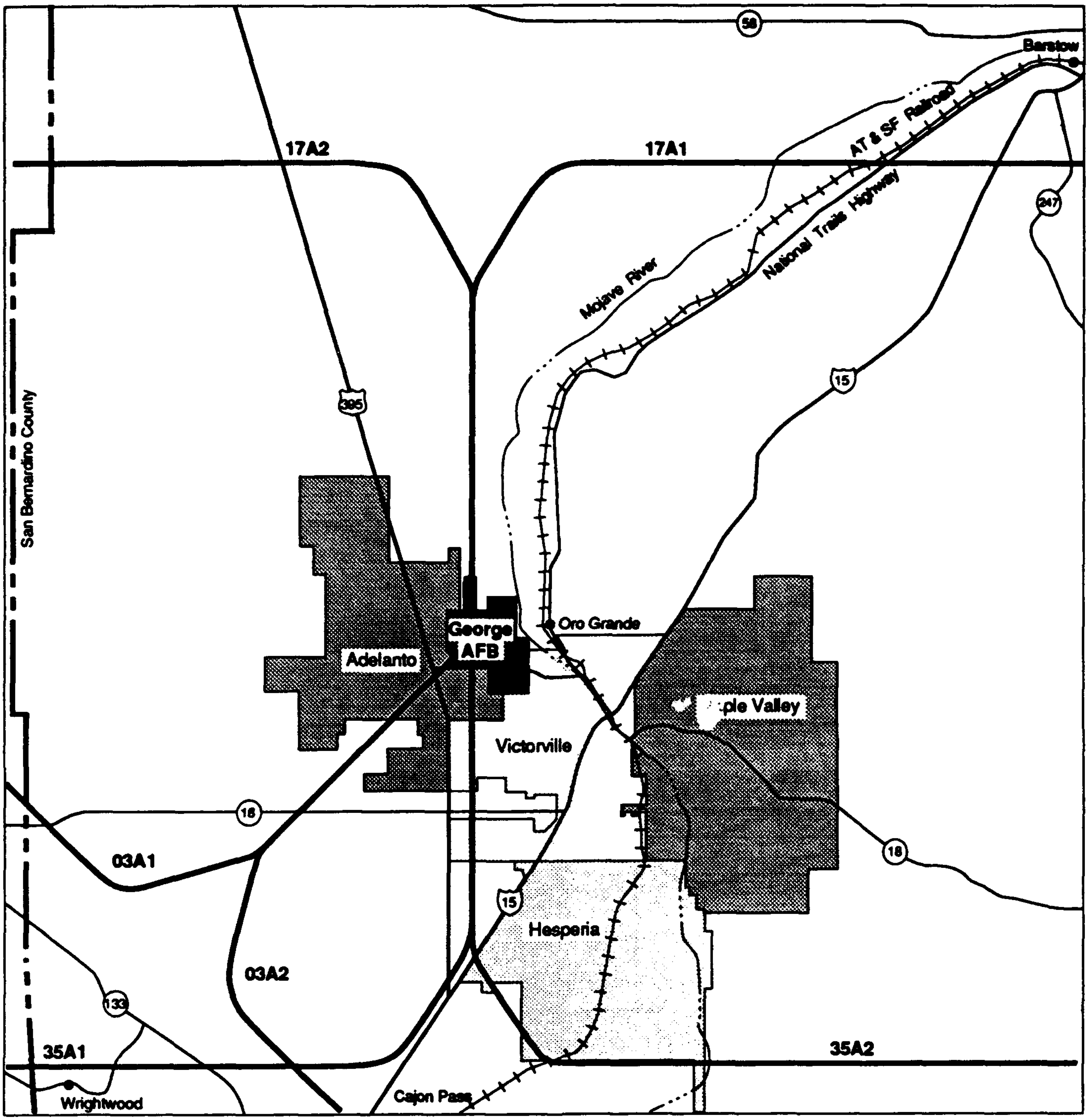
Year	Proposed Action and Alternatives	Area Within Noise Contour (acres) DNL Range			Approximate Population Exposed DNL Range		
		65-70	70-75	>75	65-70	70-75	>75
1993	Proposed Action*	329	155	68	0	0	0
	International Airport Alternative	0	0	0	0	0	0
	Commercial Airport with Residential Alt.*	328	155	68	0	0	0
	General Aviation Alternative	11	2	0	0	0	0
1998	Proposed Action	460	222	69	0	0	0
	International Airport Alternative	2,930	1,260	568	64	0	0
	Commercial Airport with Residential Alt.	458	223	69	0	0	0
	General Aviation Alternative	23	11	2	0	0	0
2003	Proposed Action	520	242	74	0	0	0
	International Airport Alternative	4,985	2,067	1,097	258	35	0
	Commercial Airport with Residential Alt.	521	242	74	0	0	0
	General Aviation Alternative	51	11	7	0	0	0
2013	Proposed Action	571	261	88	0	0	0
	International Airport Alternative	2,831	1,825	1,040	128	0	0
	Commercial Airport with Residential Alt.	571	261	88	0	0	0
	General Aviation Alternative	92	14	11	0	0	0

*Only airline training operations would be conducted in this year.



Departure Flight Tracks-Proposed Action, Commercial Airport with Residential Alternative, and General Aviation Center Alternative

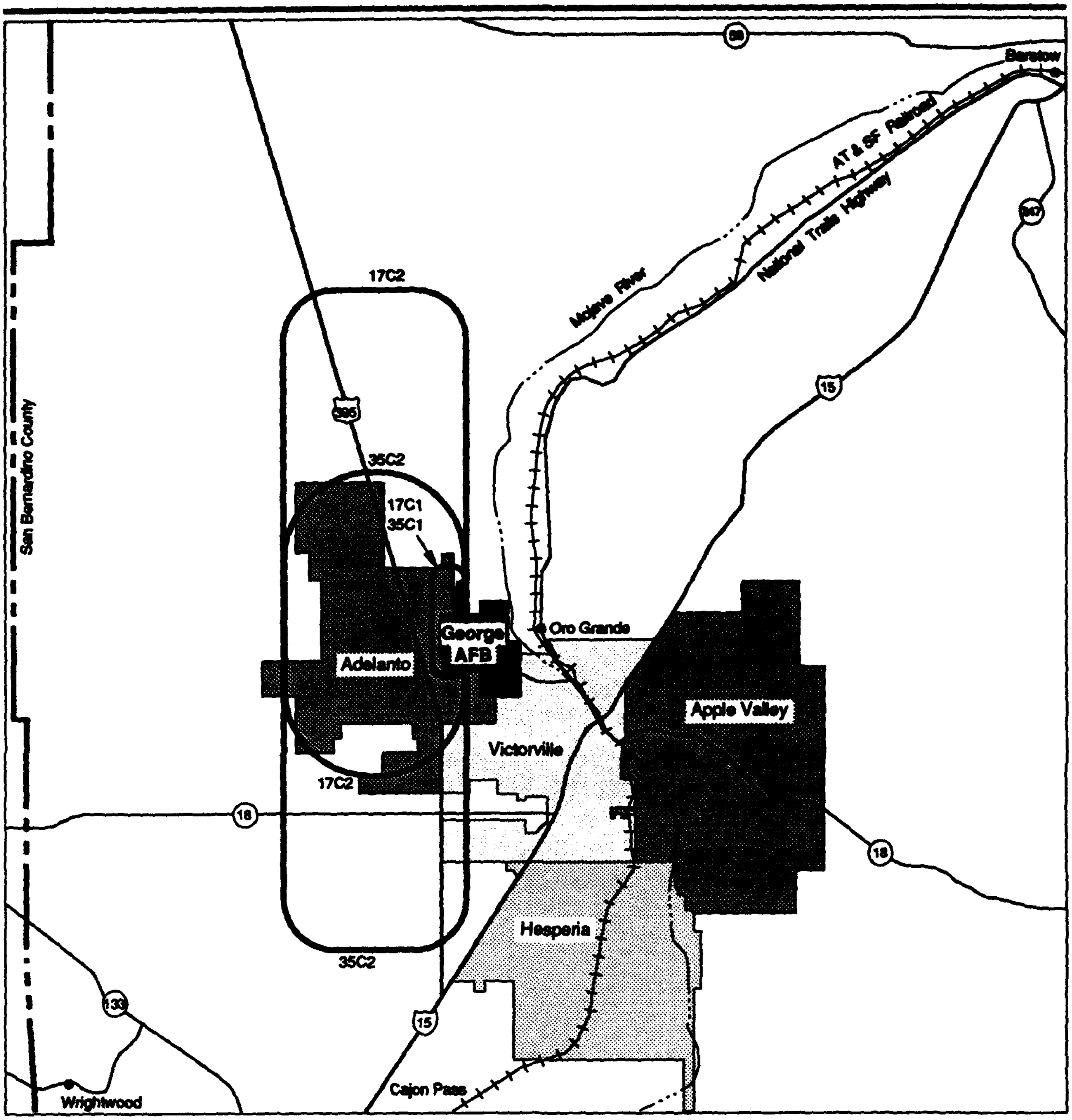
Figure 4.4-7



Arrival Flight Tracks- Proposed Action, Commercial Airport with Residential Alternative, and General Aviation Center Alternative

0 1.25 2.5 5 Nautical Miles

Figure 4.4-8



Touch-and-Go Flight Tracks- Proposed Action and Commercial Airport with Residential Alternative

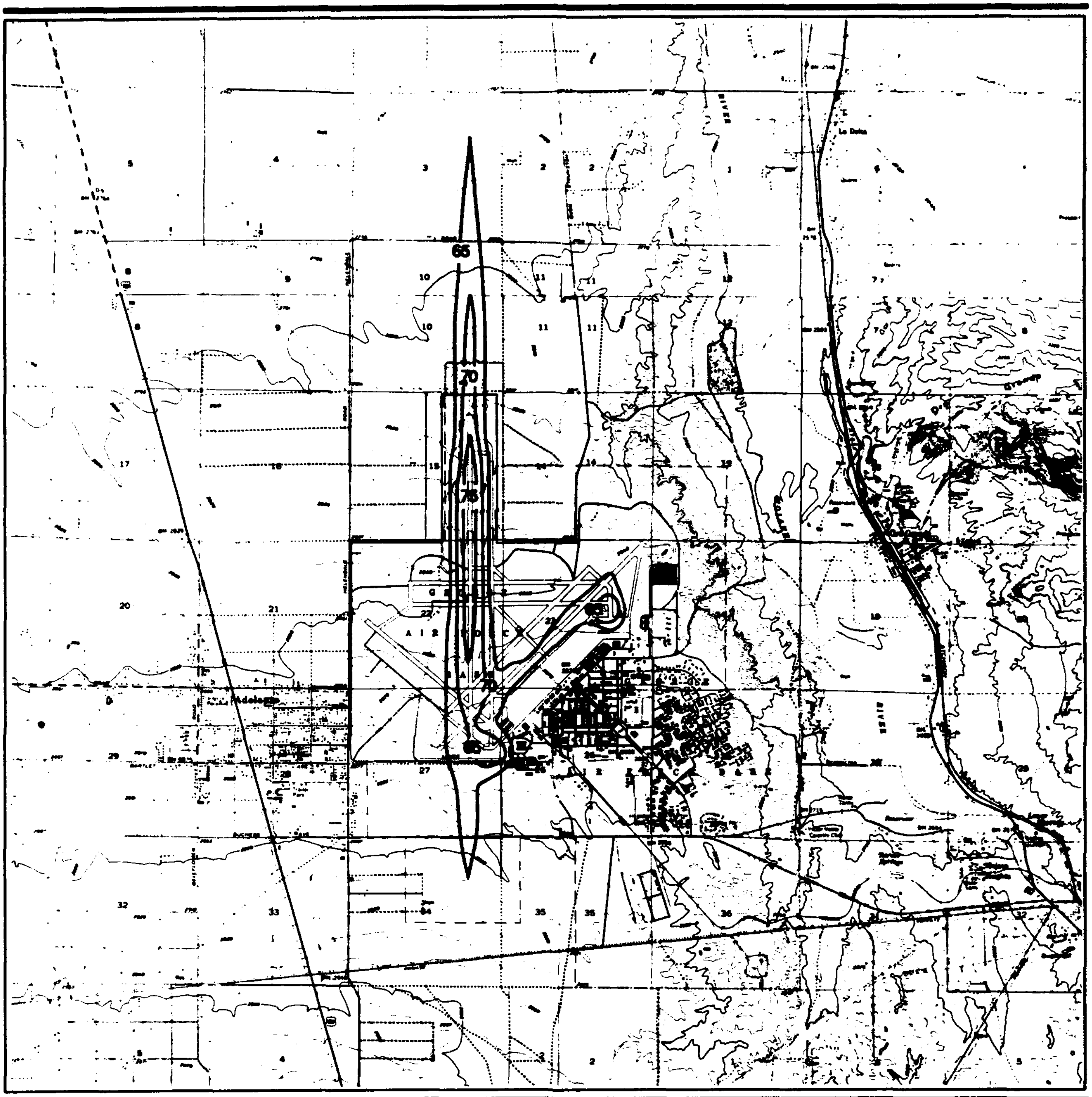
0 1.25 2.5 5 Nautical Miles

Figure 4.4-9

DNL Noise Contours-Proposed Action and Commercial Airport with Residential Alternative (1993)

0 1/4 1/2 1 Mile

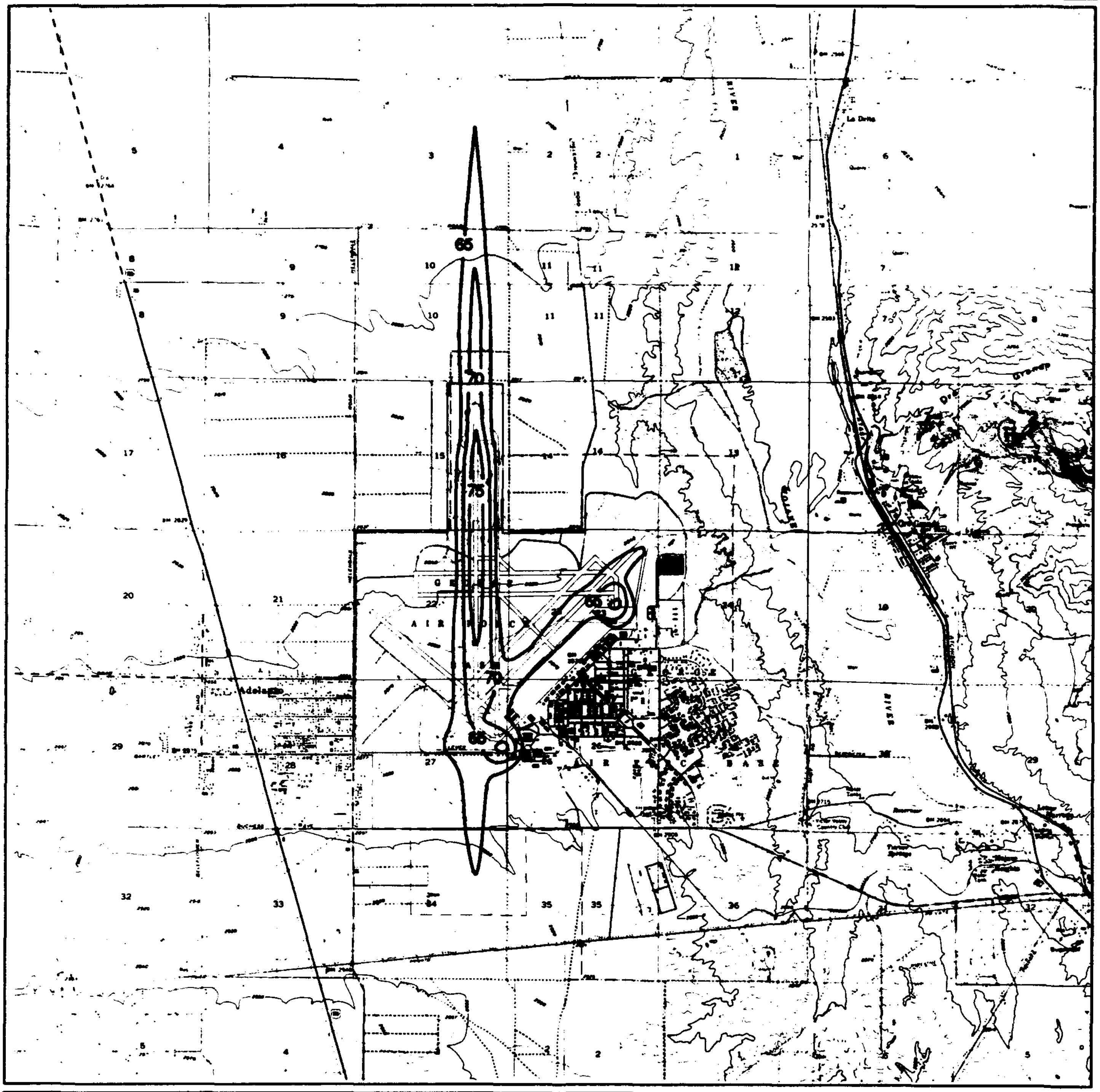
Figure 4.4-10



DNL Noise Contours-Proposed Action and Commercial Airport with Residential Alternative (1998)

0 1/4 1/2 1 Mile

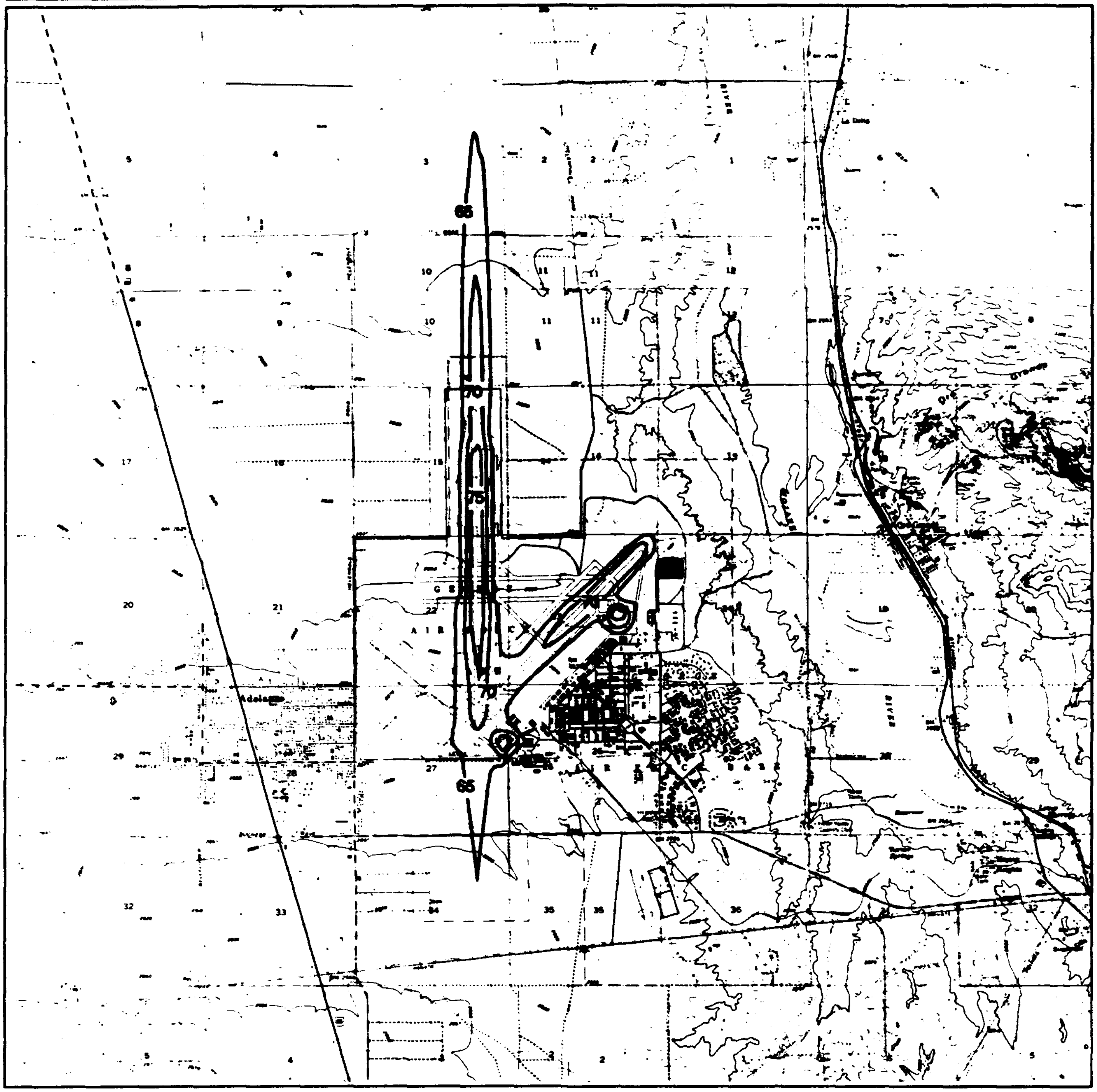
Figure 4.4-11



DNL Noise Contours-Proposed Action and Commercial Airport with Residential Alternative (2003)

0 1/4 1/2 1 Mile

Figure 4.4-12



DNL Noise Contours-Proposed Action and Commercial Airport with Residential Alternative (2013)

0 1/4 1/2 1 Mile

Figure 4.4-13

The contours around the north/south runway (17/35) are due primarily to airline training operations. In 1998, 2003, and 2013 the runups for the maintenance operations are evident in the higher noise contours around the runup pads near the ends of Runway 03/21.

Analysis suggests that for the Proposed Action, some aircraft overflights would affect the sleep of some residents in the area. In 1993 the noisiest plane would be the 747-200. In 1998 the noisiest plane would be the Stage II 727-200 aircraft. This aircraft comprises less than 1 percent of the jet aircraft. The most common jet aircraft in this year would be the 747-200 followed by the 737-200 and 757-200. In 2003 the noisiest plane would still be the 727-200. This aircraft comprises less than 1 percent of the jet aircraft. The most common jet aircraft in this year would still be the 747-200 followed by the 737-200 and 757-200. In 2013 the noisiest plane would be the 747-200. This aircraft is expected to be the most common jet aircraft in this year followed by the 737-200 and 757-200. The SEL was calculated at representative noise-sensitive receptors for the most common and noisiest commercial aircraft and the results are presented in Table 4.4-19.

Surface traffic sound levels are presented in Table 4.4-20. These levels are presented in terms of DNL as a function of distance from the centerline of the roadways analyzed. There would be an estimated 171 residents in areas exposed to noise levels of DNL 65 or greater due to surface traffic by the year 2013.

Cumulative Impacts. There are no cumulative impacts expected from noise sources for the Proposed Action.

Mitigation Measures. No impacts from aircraft noise have been identified based on the FAA land use guidelines presented in Table 3.4-8. Mitigation would not be required for aircraft noise for the Proposed Action. A barrier along Air Base Road and portions of U.S. 395 may be feasible and could reduce traffic noise levels at nearby residences to below DNL 65 dB. Barriers for other roadways are not considered to be feasible due to the number of driveways and intersections near the impacted roadways. Mitigation measures such as a sound attenuation program could be implemented to reduce interior noise levels for sensitive receptors exposed to DNL 65 dB or greater. Preventative measures such as restricting residential and hospital development to areas outside DNL 65 dB and incorporating barriers into community development can be used for future development.

The effectiveness of the operational and management mitigation measures presented here cannot be completely determined without extensive modeling.

Table 4.4-19. Sound Exposure Levels at Noise-Sensitive Receptors

Alternative	Location	SEL DC-9	727	737	747	757	MD-80/83
Proposed Action and Commercial Airport with Residential	Adelanto Rd & Bartlett Ave	84	95	81	87	82	87
	U.S. 395 & Bartlett Ave.	86	88	72	78	74	78
	U.S. 395 & Crippen Ave	80	82	66	72	69	72
	Crippen Ave & Adelanto Rd	86	87	74	78	76	80
	Air Base Rd & Adelanto Rd	102	106	89	96	89	94
	Cobalt Rd & Route 18	73	75	68	78	66	68
	U.S. 395 & Route 18	73	75	88	77	85	88
	Mojave Dr & Elevado Rd	61	63	45	59	50	51
	Bear Valley Cutoff and I-15	57	60	51	61	49	52
	Shadow Mtn Rd & Silver Lake Pkwy	75	80	62	66	63	70
	Shay Rd off of Runway 03/21	75	77	62	68	65	67
	The Bureau of Prisons Facility	74	75	61	73	66	67
	Alaska Circle Housing	73	75	60	70	65	67
	San Bernardino Work Furlough Dormitories	82	84	69	75	76	76
	Private Medical Institution	75	77	62	71	68	68
	Victorville Hospital	54	54	33	45	39	43
International Airport	Adelanto Rd & Bartlett Ave	104	110	90	99	90	96
	U.S. 395 & Bartlett Ave	94	95	50	57	60	85
	U.S. 395 & Crippen Ave	66	77	73	79	74	78
	Crippen Ave & Adelanto Rd	97	97	83	90	84	90
	Air Base Rd & Adelanto Rd	101	105	88	95	87	93
	Cobalt Rd & Route 18	73	75	88	70	66	68
	U.S. 395 & Route 18	82	85	78	80	76	77
	Mojave Dr & Elevado Rd	61	63	45	53	50	52
	Bear Valley Cutoff and I-15	58	60	52	55	50	53
	Shadow Mtn Rd & Silver Lake Pkwy	87	95	74	85	73	80
	Shay Rd off of Runway 03/21	81	73	56	62	60	76
	The Bureau of Prisons Facility	75	76	63	67	66	68
	Alaska Circle Housing	75	75	62	66	65	67
	San Bernardino Work Furlough Dormitories	85	84	66	75	81	77
	Private Medical Institution	77	78	65	69	71	69
	Victorville Hospital	52	54	34	42	39	43
General Aviation	Adelanto Rd & Bartlett Ave	-	-	81	87	-	-
	U.S. 395 & Bartlett Ave	-	-	72	78	-	-
	U.S. 395 & Crippen Ave	-	-	66	72	-	-
	Crippen Ave & Adelanto Rd	-	-	74	78	-	-
	Air Base Rd & Adelanto Rd	-	-	89	96	-	-
	Cobalt Rd & Route 18	-	-	68	78	-	-
	U.S. 395 & Route 18	-	-	68	77	-	-
	Mojave Dr & Elevado Rd	-	-	45	59	-	-
	Bear Valley Cutoff and I-15	-	-	51	51	-	-
	Shadow Mtn Rd & Silver Lake Pkwy	-	-	62	68	-	-
	Shay Rd off of Runway 03/21	-	-	62	68	-	-
	The Bureau of Prisons Facility	-	-	61	73	-	-
	Alaska Circle Housing	-	-	80	70	-	-
	San Bernardino Work Furlough Dormitories	-	-	69	75	-	-
	Private Medical Institution	-	-	62	71	-	-
	Victorville Hospital	-	-	33	45	-	-

Table 4.4-20. Distance to DNL from Roadway Centerline - Proposed Action

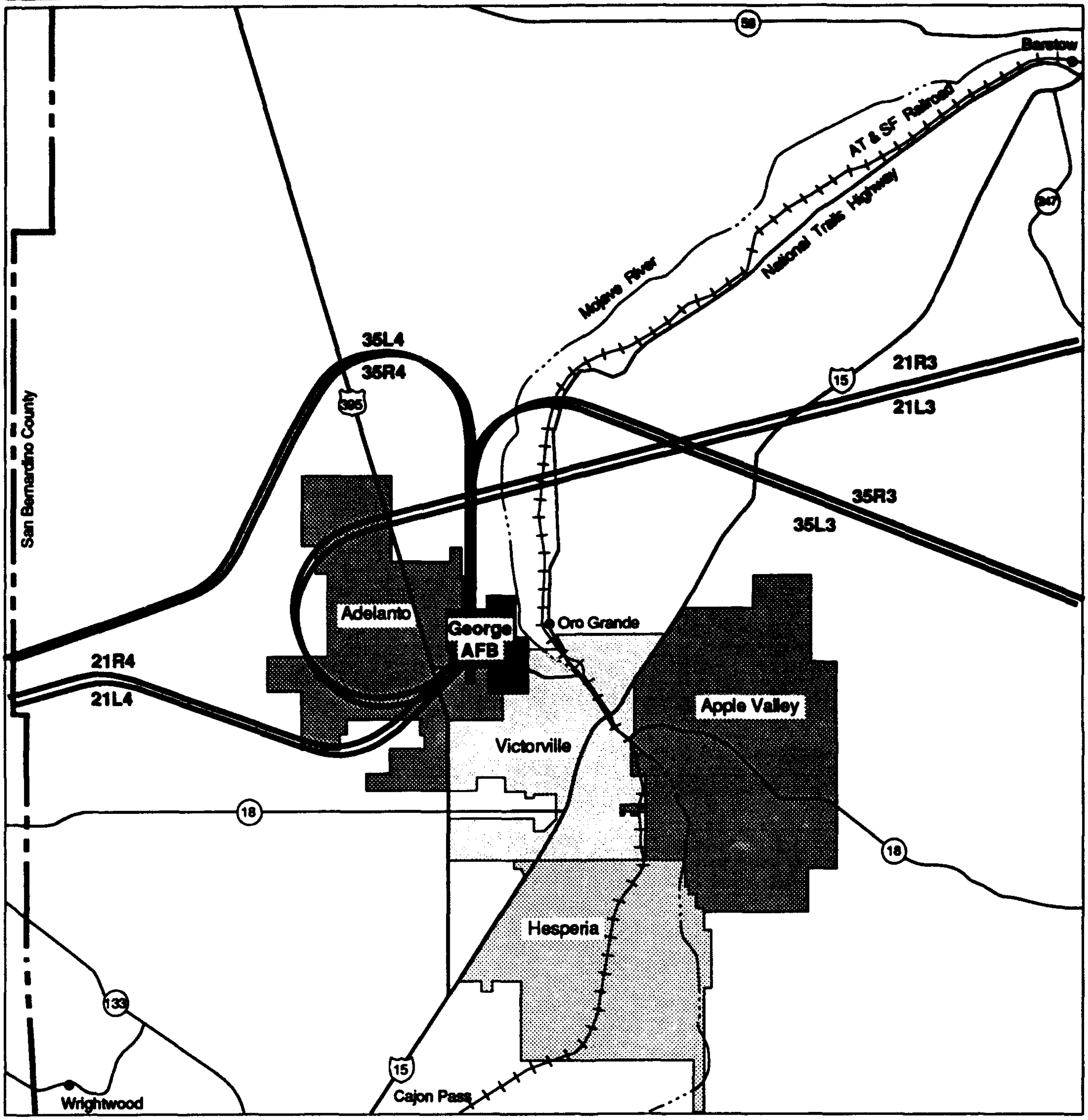
Year	Roadway	Distance (feet)					
		DNL 65	No. of Residences	DNL 70	No. of Residences	DNL 75	No. of Residences
1998	Air Base Road West	70	0	*	–	*	–
	Air Base Road East	160	3	50	0	*	–
	U.S. 395	270	21	80	0	30	0
	El Mirage Road	40	0	*	–	*	–
	Helendale Road	*	–	*	–	*	–
	Village Drive**	90	2	*	–	*	–
	Shay Road	40	0	*	–	*	–
2003	Air Base Road West	120	2	40	0	*	–
	Air Base Road East	260	5	90	2	*	–
	U.S. 395	340	21	100	0	30	0
	El Mirage Road	80	0	*	–	*	–
	Helendale Road	40	0	*	–	*	–
	Village Drive**	150	2	60	0	*	–
	Shay Road	70	0	*	–	*	–
2013	Air Base Road West	170	6	60	0	*	–
	Air Base Road East	360	6	130	2	*	–
	U.S. 395	430	43	130	0	40	0
	El Mirage Road	110	0	30	0	*	–
	Helendale Road	60	0	*	–	*	–
	Village Drive**	210	2	80	0	*	–
	Shay Road	110	0	30	0	*	–

*Contained within roadway.
**Number of houses between Air Base Road and power lines south of Clovis Street (approximately 1.5 miles).

4.4.4.2 International Airport Alternative. Figures 4.4-14 and 4.4-15 present the flight tracks for the International Airport Alternative. The results of the aircraft noise modeling for the International Airport Alternative are presented as noise contours in Figures 4.4-16 through 4.4-18.

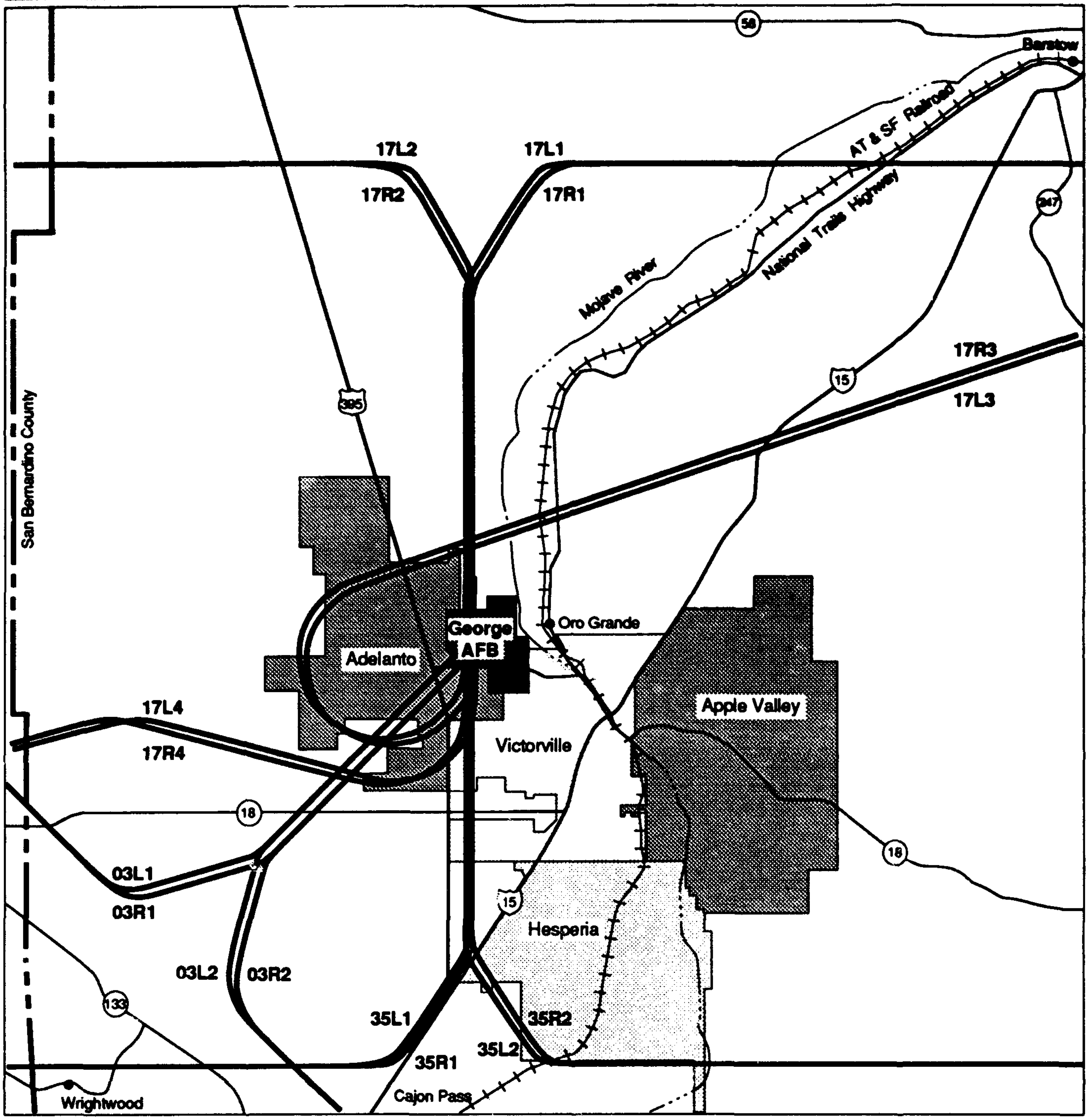
The contours around the north end of the north/south runways (17R, 17L, 35R, and 35L) are due primarily to arrivals. Around the south end of the north/south runways the contours are due primarily to takeoffs. The break in the contours near the north end of the runways is an artifact of the model, since it stops considering noise from landing aircraft at the point where they touch down. Runups for the maintenance operations are evident in the circular noise contours south of the proposed terminal. The contours to the southwest of runways 03L, 03R, 21L, and 21R are due primarily to departing aircraft.

It is estimated that the International Airport Alternative would expose approximately 4,758 acres and 64 people to a DNL of 65 dB or greater in the year 1998. This is estimated to be approximately 5,696 acres and 128 people by the year 2013. Table 4.4-18 presents the approximate number of acres and



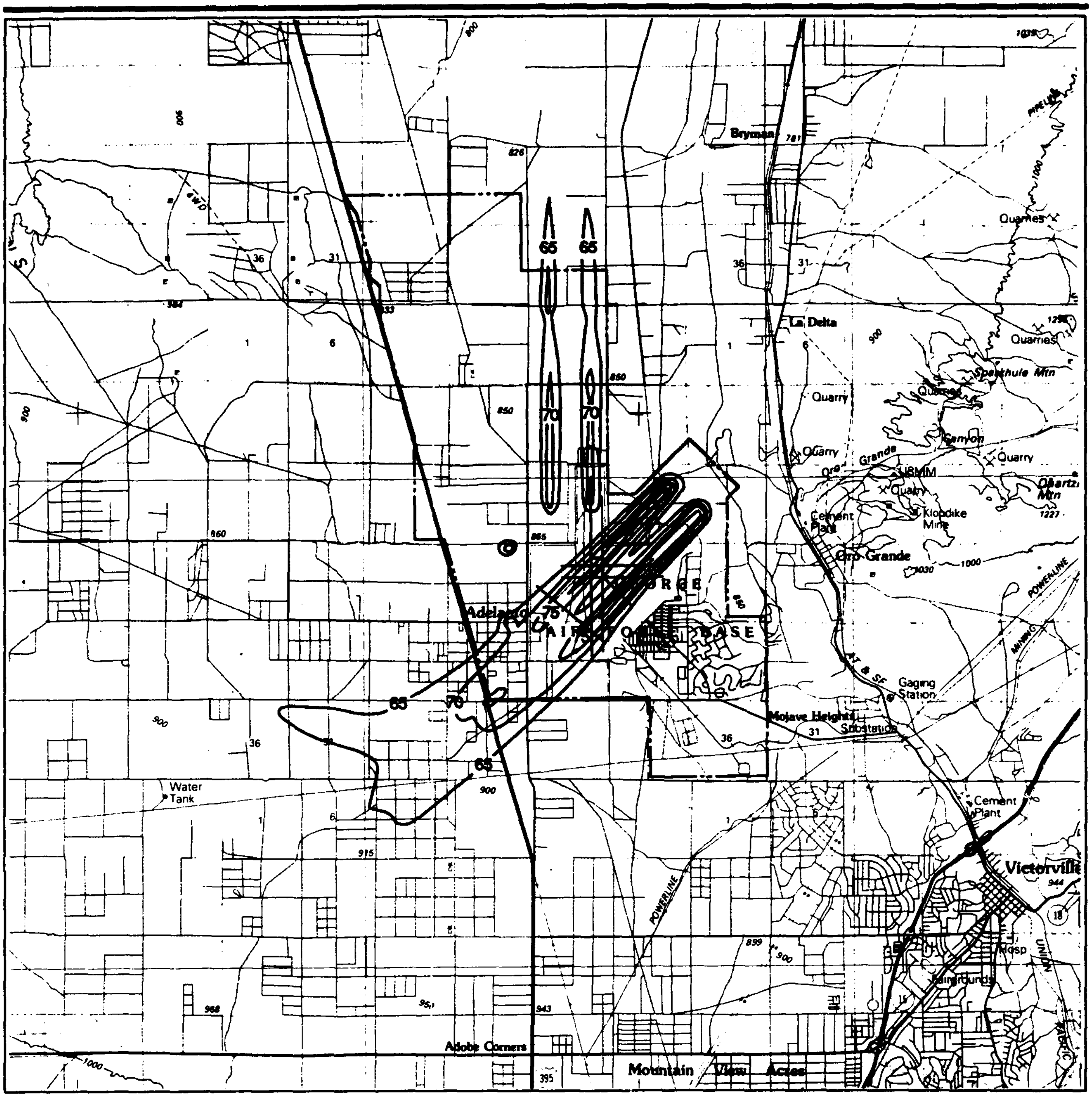
Departure Flight Tracks-International Airport Alternative

Figure 4.4-14



Arrival Flight Tracks-International Airport Alternative

Figure 4.4-15



DNL Noise Contours International Airport Alternative (1998)

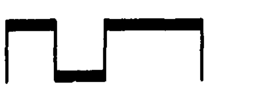
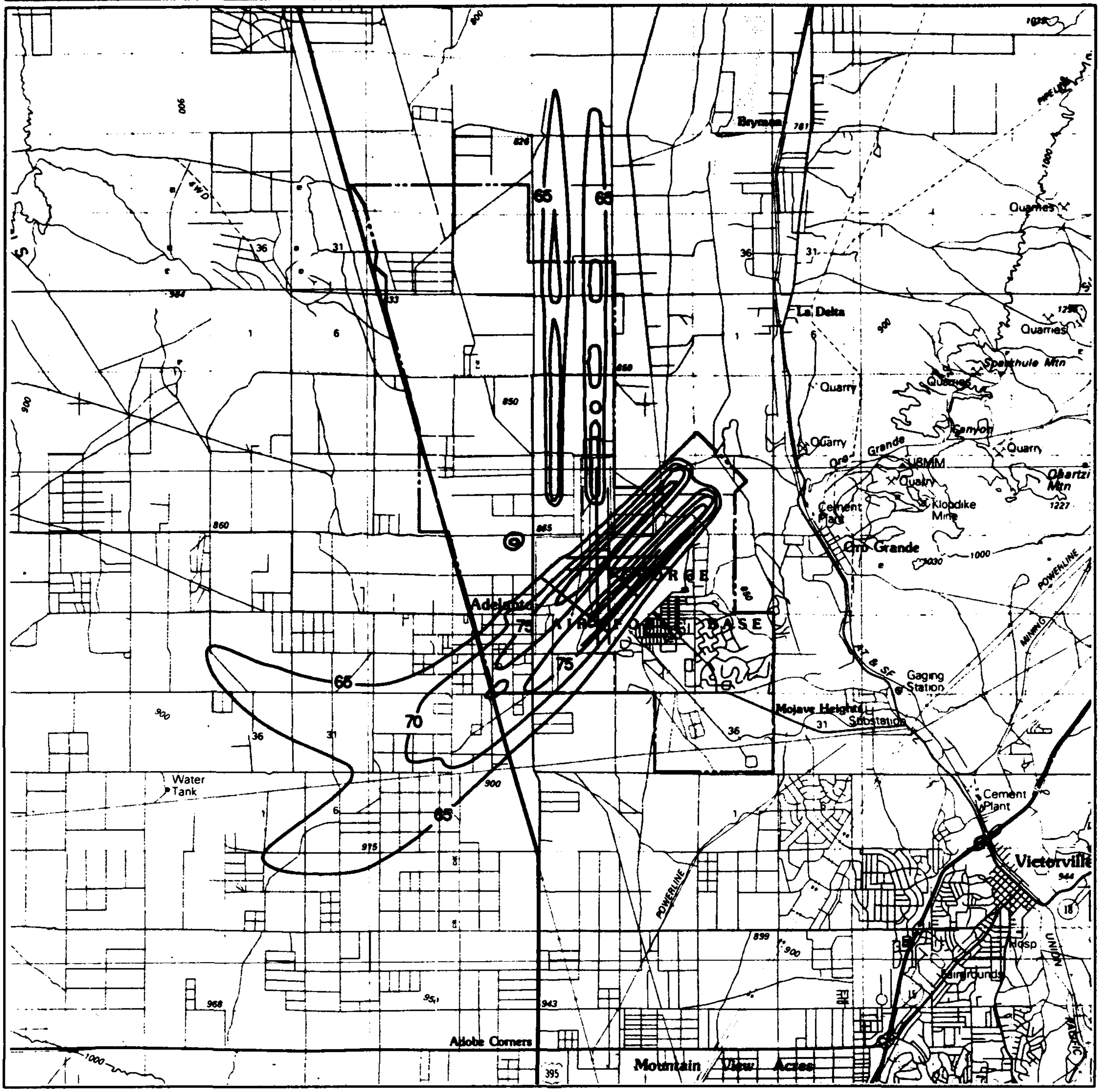


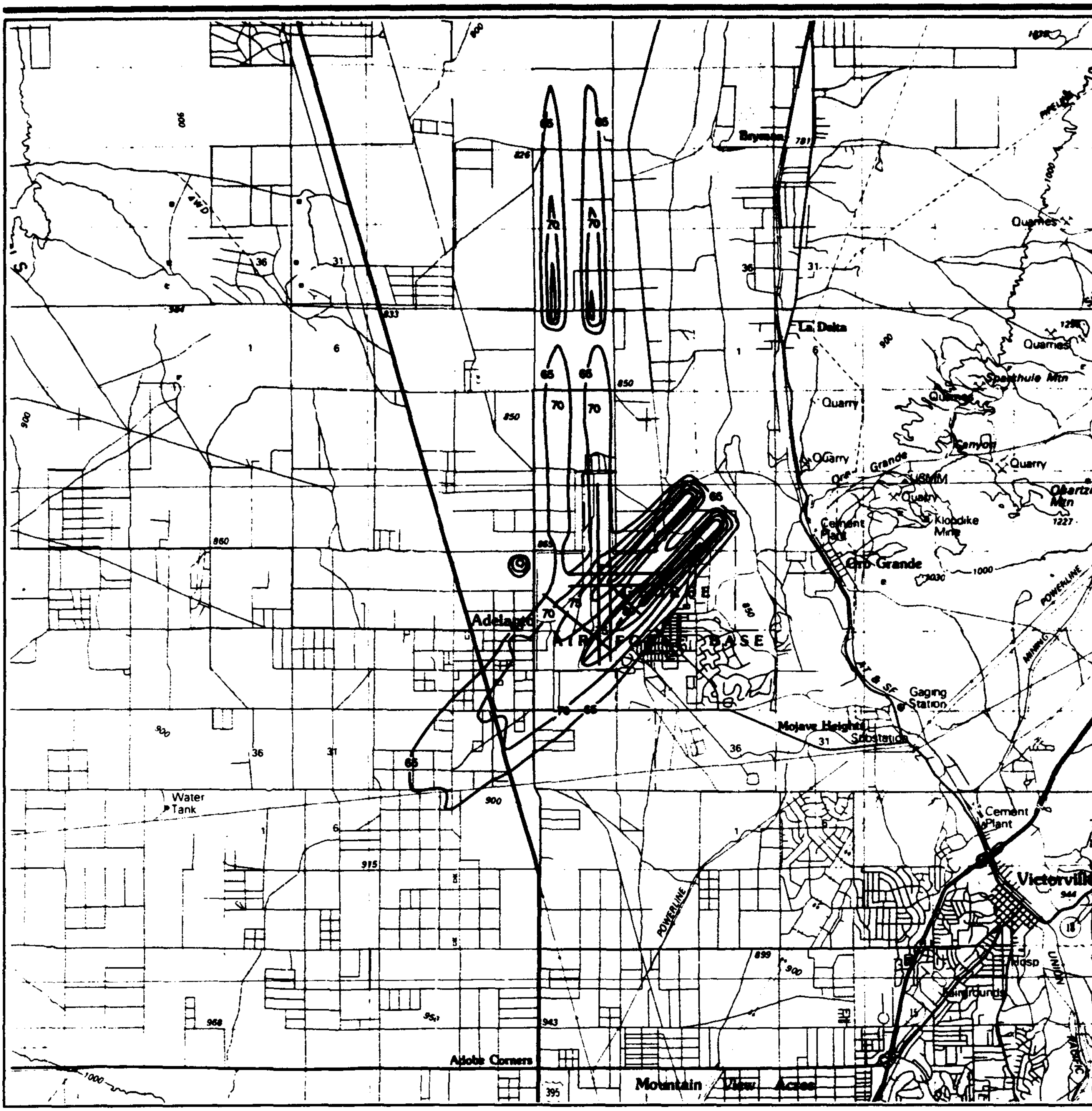
Figure 4.4-16



DNL Noise Contours International Airport Alternative (2003)

0 2,500 5,000 10,000 Feet

Figure 4.4-17



DNL Noise Contours International Airport Alternative (2013)

0 2,500 5,000 10,000 Feet

Figure 4.4-18

people residing within each DNL compatibility range for each representative year. Based on the results presented in Table 4.2-18 and the FAA land use guidelines, the residential land uses within the 65 dB contour present an incompatible land use.

Analysis suggests that for the International Airport Alternative, some aircraft overflights would affect the sleep of some residents in the area. In 1998 the noisiest plane would be the 727-200. This aircraft comprises less than 1 percent of the non-general aviation aircraft. The most common jet aircraft in this year would be the DC-9-30 followed by the 737-300 and MD-80. In 2003 the noisiest plane would be the 747-200. This aircraft comprises less than 1 percent of the jet aircraft. The most common jet aircraft in this year would still be the 737-300 followed by the DC-9-30, MD-80, and 757-200. In 2013 the noisiest plane would be the 747-200. The most common jet aircraft in this year would be the 757-200 followed by the 747-200 and MD-83. The SEL was calculated at representative noise-sensitive receptors for the most common and noisiest aircraft and the results are presented in Table 4.4-19.

Surface traffic sound levels, presented in Table 4.4-21, are represented in terms of DNL as a function of distance from the centerline of the roadways analyzed. There would be an estimated 1,209 residents in the areas exposed to noise levels of DNL 65 or greater due to surface traffic by the year 2013.

Cumulative Impacts. There are no cumulative impacts expected from noise sources for the International Airport Alternative.

Mitigation Measures. Measures that could be considered to reduce the effects of aircraft noise include:

- **Operational measures.** Change takeoff, climb-out, or landing procedures; change flight tracks, limit or rotate primary runway usage, enforce prescribed flight track use and fan out departure flight tracks. Prohibit or limit Stage II aircraft operations.
- **Preventive measures.** Acquire undeveloped land adjacent to the runway that is exposed to aircraft noise of DNL 65 dBA or greater. Restrict residential and hospital development to areas outside the DNL 65 contour.
- **Management measures.** Impose curfews, impose noise-related landing fees, develop noise monitoring system, establish a community relations office.
- **Remedial measures.** Acquire mobile home sites and single-family housing areas exposed to aircraft noise of DNL 70 dB or greater. Redevelop mobile home sites to other compatible uses. Establish and conduct a sound attenuation program for single-family residences, schools, hospitals, and churches in areas exposed to aircraft noise of 65 dB or greater.

Table 4.4-21. Distance to DNL from Roadway Centerline - International Airport Alternative

		Distance (feet)					
Year	Roadway	DNL 65	No. of Residences	DNL 70	No. of Residences	DNL 75	No. of Residences
1998	Air Base Road West	100	2	40	0	*	–
	Air Base Road East	200	3	70	2	*	–
	U.S. 395	1,010	150	330	21	100	0
	El Mirage Road	300	0	100	0	40	–
	Desert Flower	310	0	100	0	40	0
	Village Drive**	200	2	70	0	*	–
2003	Air Base Road West	120	2	40	0	*	–
	Air Base Road East	230	4	80	0	*	-
	U.S. 395	1,170	187	380	23	120	0
	El Mirage Road	340	0	120	0	40	0
	Desert Flower	360	0	120	0	40	0
	Village Drive**	230	2	80	0	*	–
2013	Air Base Road West	190	6	70	0	30	0
	Air Base Road East	370	6	130	0	50	0
	U.S. 395	1,880	308	630	74	200	13
	El Mirage Road	580	0	210	0	70	0
	Desert Flower	620	0	210	0	70	0
	Village Drive**	400	8	140	2	50	0

*Contained within roadway.

**Number of houses between Air Base Road and power lines south of Clovis Street (approximately 1.5 miles).

A barrier along Air Base Road and portions of U.S. 395 may be a feasible way to reduce surface traffic noise levels at nearby residences to below DNL 65 dB. Barriers for other roadways are not considered to be feasible due to the number of driveways and intersections near the impacted roadways. Mitigation measures such as a sound attenuation program similar to that identified for aircraft noise mitigation could be implemented to reduce interior noise levels for sensitive receptors exposed to DNL 65 dB or greater. Preventative measures such as restricting residential and hospital development to areas outside DNL 65 dB and incorporating barriers into community development can be used for future development.

The effectiveness of the operational and management mitigation measures presented here cannot be completely determined without extensive modeling. The preventative measures would reduce future impacts in areas where this measure is implemented. The remedial measures such as acquiring homes exposed to 70 dB or greater climinates these impacts completely. Sound attenuation programs in areas exposed to 65 dBA can be effective at reducing the noise impacts to interior spaces.

4.4.4.3 Commercial Airport with Residential Alternative. Flight operations under this alternative are the same as for the Proposed Action; therefore,

Figures 4.4-7 through 4.4-9 are also applicable for the flight tracks of the Commercial Airport with Residential Alternative. The noise contours for the Commercial Airport with Residential Alternative are the same as those for the Proposed Action, and are also applicable to Figures 4.4-10 through 4.4-13. Because some land uses are not the same under this alternative and the Proposed Action, the effects of the noise would be different for these two actions.

It is estimated that the Commercial Airport with Residential Alternative would expose approximately 551 acres and no people to a DNL of 65 dB or greater in the year 1993. This is estimated to reach 920 acres and no people by the year 2013. Table 4.4-18 presents the approximate number of acres and people residing within each DNL compatibility range for each representative year. Analysis suggests that for the Commercial Airport with Residential Alternative, the noisiest overflight may affect the sleep of some residents in the area for the years 1998, 2003, and 2013. The flight operations are the same as in the Proposed Action. The SEL was calculated at representative noise-sensitive receptor locations and the results are presented in Table 4.4-19. These results are identical to those shown for the Proposed Action, in Section 4.4.4.1.

Surface traffic sound levels are presented in Table 4.4-22. These levels are presented in terms of DNL as a function of distance from the centerline of the roadways analyzed. There would be an estimated 281 residents in areas exposed to noise levels of DNL 65 or greater due to surface traffic by the year 2013.

Cumulative Impacts. There are no cumulative impacts expected from noise sources for the Commercial Airport with Residential Alternative.

Mitigation Measures. No impacts from aircraft noise have been identified based on the FAA land use guidelines presented in Table 3.4-8. Noise mitigation would not be required for aircraft noise for the Commercial Airport with Residential Alternative. A barrier along Air Base Road and portions of U.S. 395 may be a feasible way to reduce noise levels at nearby residences to below DNL 65 dB. Barriers for other roadways are not considered to be feasible due to the number of driveways and intersections near the impacted roadways. Mitigation measures such as a sound attenuation program similar to that identified for aircraft noise mitigation could be implemented to reduce interior noise levels for sensitive receptors exposed to DNL 65 dB or greater. Preventative measures such as restricting residential and hospital development to areas outside DNL 65 dB and incorporating barriers into community development can be used for future development.

The effectiveness of the mitigation measures presented here cannot be completely determined without extensive modelling.

Table 4.4-22. Distance to DNL from Roadway Centerline - Commercial Airport with Residential Alternative

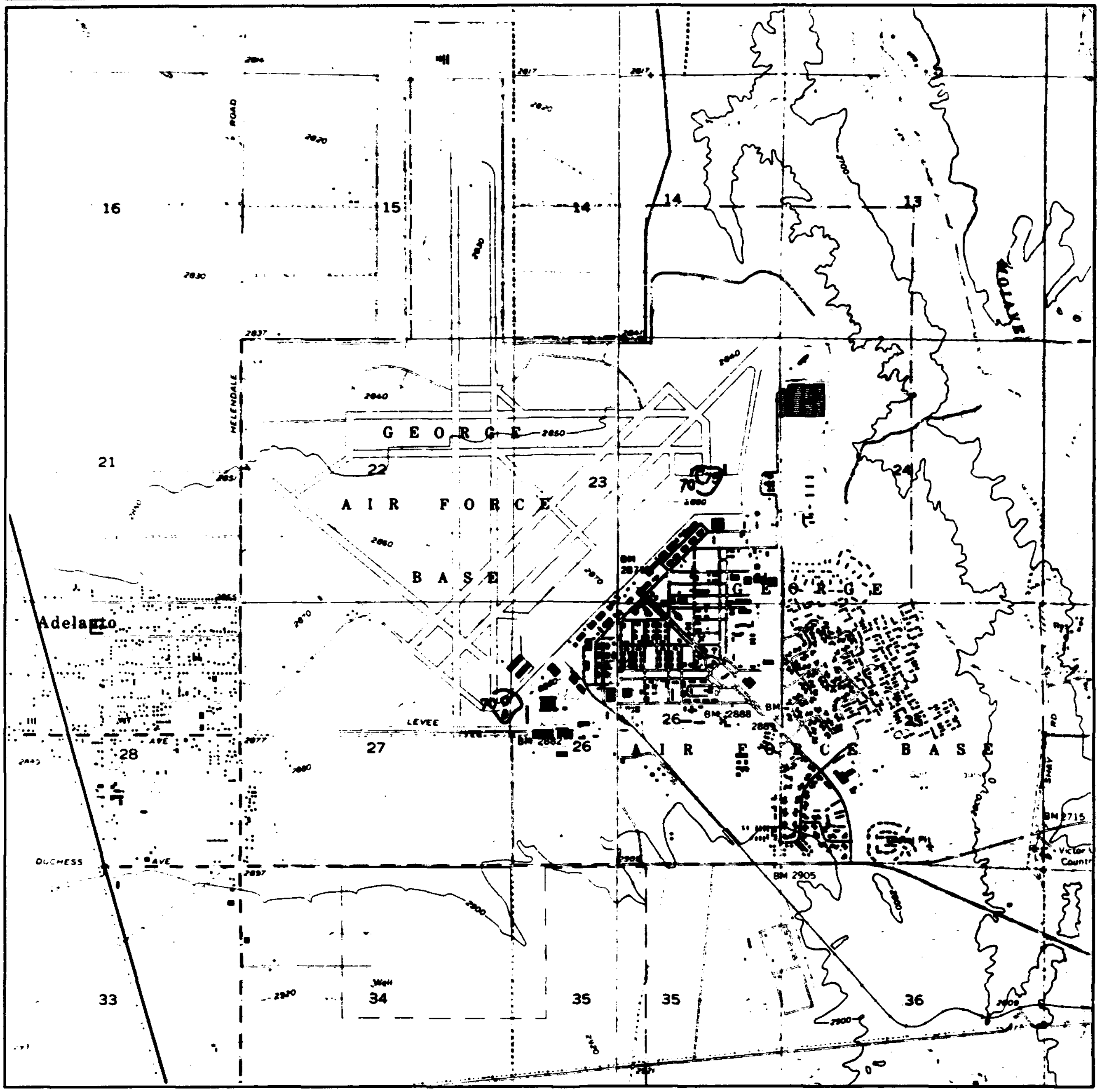
Year	Roadway	Distance (feet)					
		DNL 65	No. of Residences	DNL 70	No. of Residences	DNL 75	No. of Residences
1998	Air Base Road West	140	2	50	0	*	–
	Air Base Road East	300	5	100	2	*	–
	U.S. 395	340	21	110	0	40	0
	El Mirage Road	50	0	*	0	*	–
	Helendale Road	50	0	*	–	*	–
	Village Drive**	170	2	60	0	*	–
	Shay Road	80	0	30	0	*	–
2003	Air Base Road West	180	6	60	0	*	–
	Air Base Road East	380	7	130	0	50	0
	U.S. 395	390	29	130	0	50	0
	El Mirage Road	60	0	30	0	*	–
	Helendale Road	60	0	*	–	*	–
	Village Drive**	220	2	80	0	*	–
	Shay Road	110	0	40	0	*	–
2013	Air Base Road West	250	9	90	2	30	0
	Air Base Road East	520	17	180	3	60	0
	U.S. 395	500	43	160	13	50	0
	El Mirage Road	80	0	30	0	*	–
	Helendale Road	80	0	30	0	*	–
	Village Drive**	310	8	110	2	*	–
	Shay Road	160	0	50	0	*	–

*Contained within roadway.
**Number of houses between Air Base Road and power lines south of Clovis Street (approximately 1.5 miles).

4.4.4.4 General Aviation Center Alternative. Figures 4.4-7 and 4.4-8 show the flight tracks for the General Aviation Center Alternative. The results of the aircraft noise modeling for the General Aviation Center Alternative are presented as noise contours in Figures 4.4-19 through 4.4-22.

The General Aviation Center Alternative is estimated to expose approximately 13 acres and no people to a DNL of 65 dB or greater in the year 1993. This is estimated to be approximately 117 acres and no people by the year 2013. Table 4.4-18 presents the approximate number of acres and people residing within each DNL compatibility range.

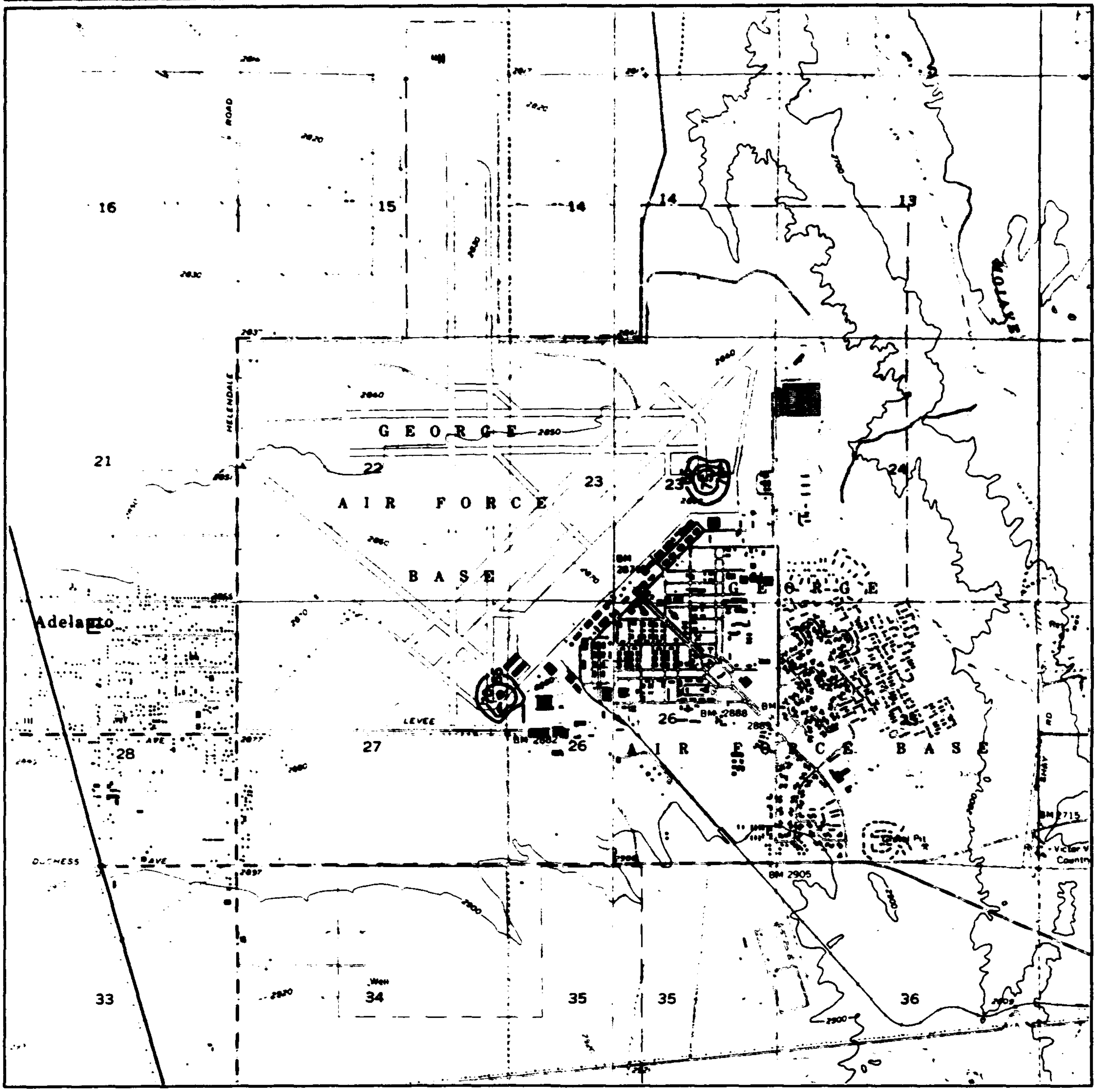
Analysis suggests that the noisiest overflight may affect the sleep of some residents in the area. The SEL was calculated at representative noise-sensitive receptor locations and the results are presented in Table 4.4-19. The number of aircraft types are reduced for this alternative, since commercial aircraft operations are limited to maintenance activities.



DNL Noise Contours
General Aviation
Center Alternative
(1993)

0 750 1500 3000 Feet

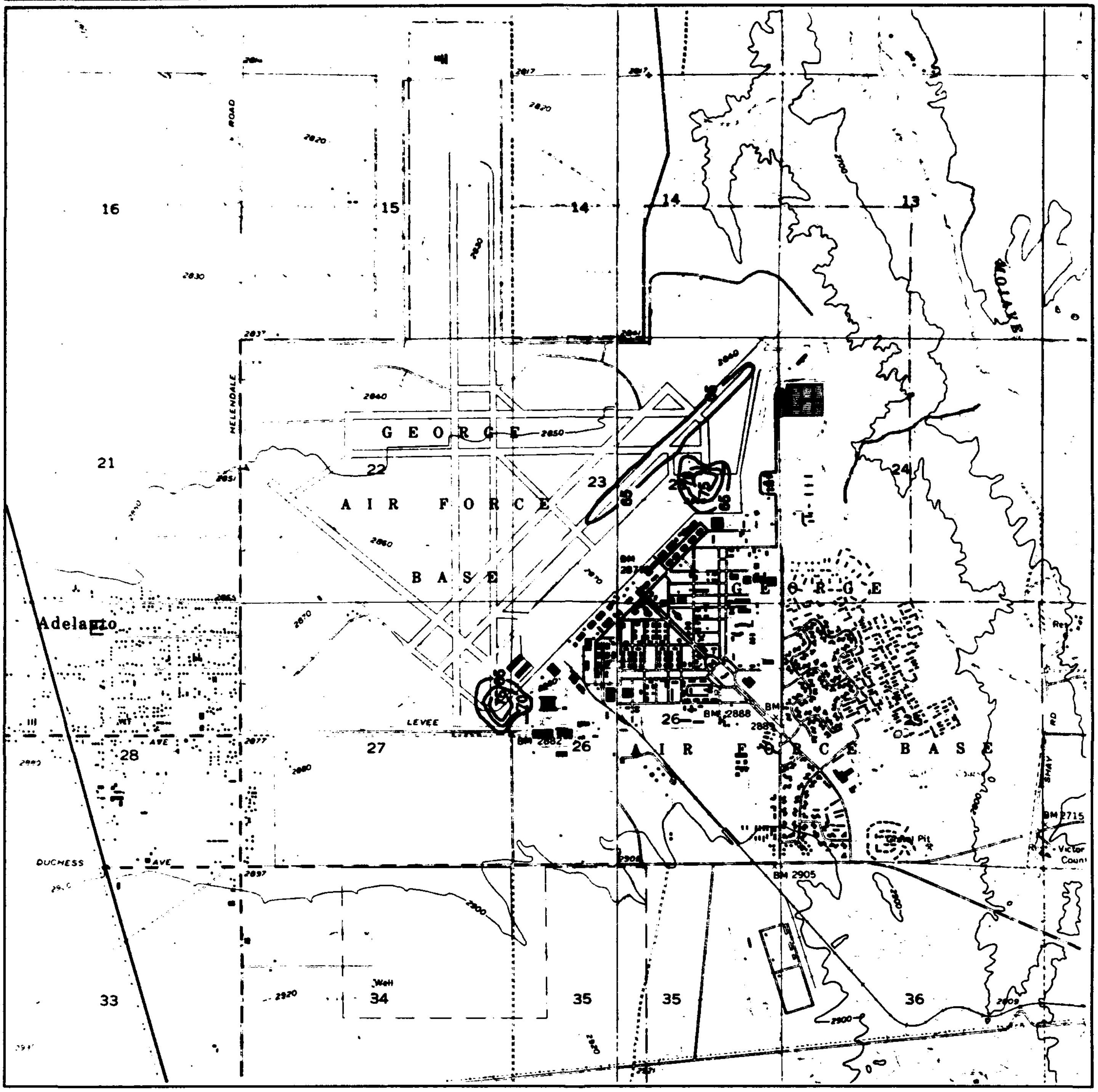
Figure 4.4-19



DNL Noise Contours General Aviation Center Alternative (1998)

0 750 1500 3000 Feet

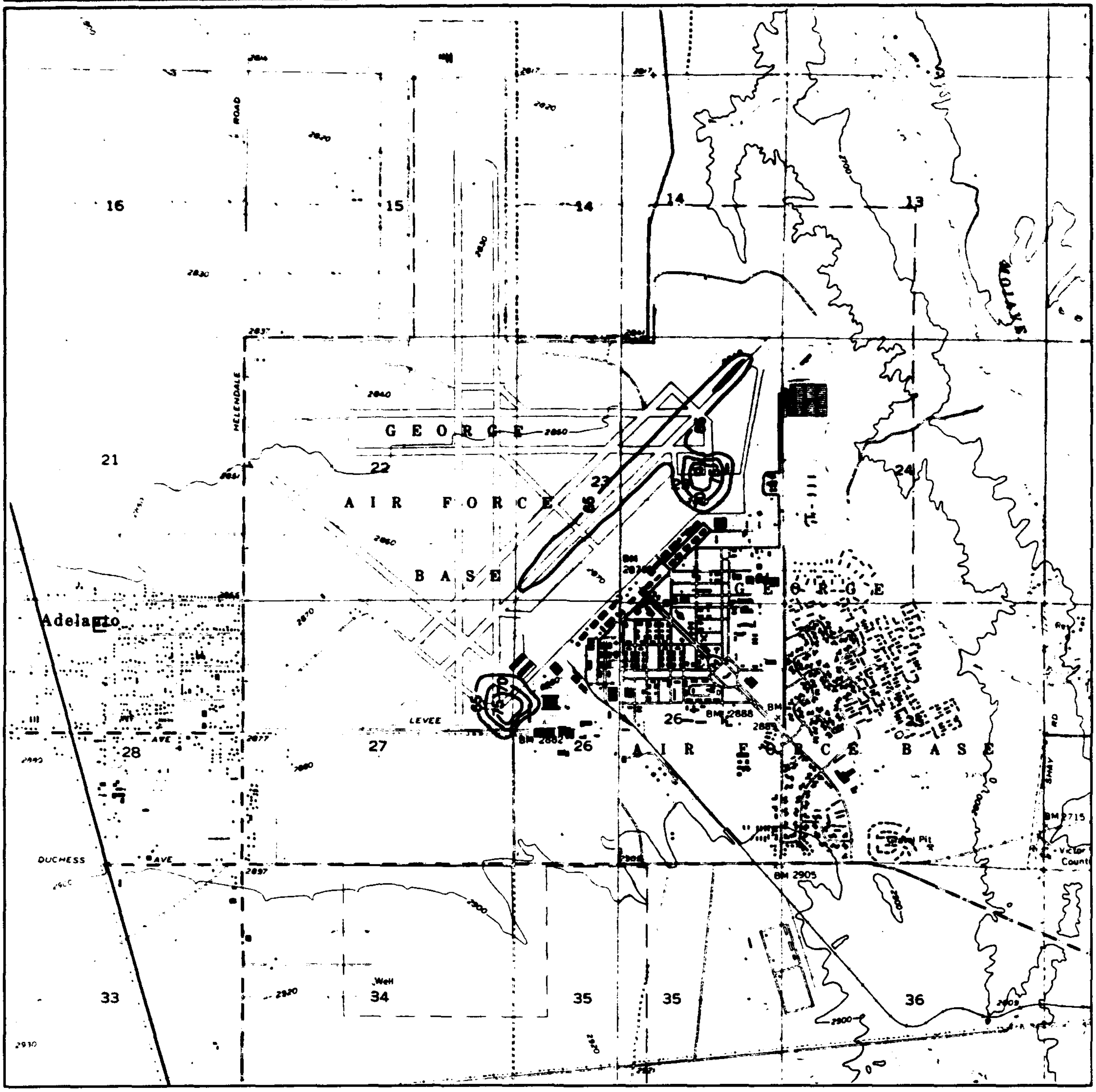
Figure 4.4-20



DNL Noise Contours General Aviation Center Alternative (2003)

0 750 1500 3000 Feet

Figure 4.4-21



DNL Noise Contours General Aviation Center Alternative (2013)

0 750 1500 3000 Feet

Figure 4.4-22

Surface traffic sound levels are presented in Table 4.4-23. These levels are presented in terms of DNL as a function of distance from the centerline of the roadways analyzed. There would be an estimated 325 residents in areas exposed to noise levels of DNL 65 or greater due to surface traffic by the year 2013.

Cumulative Impacts. There are no cumulative impacts expected from noise sources for the General Aviation Center Alternative.

Mitigation Measures. No impacts from aircraft noise have been identified based on the FAA land use guidelines presented in Table 3.4-8. Noise mitigation would not be required for aircraft noise for the General Aviation Center Alternative. A barrier along Air Base Road and portions of U.S. 395 may be a feasible way to reduce noise levels at nearby residences to below DNL 65 dB. Barriers for other roadways are not considered to be feasible due to the number of driveways and intersections near the impacted roadways. Mitigation measures such as a sound attenuation program similar to that identified for aircraft noise mitigation could be implemented to reduce interior noise levels for sensitive receptors exposed to DNL 65 dB or greater. Preventative measures such as restricting residential and hospital development to areas outside DNL 65 dB and incorporating barriers into community development can be used for future development.

The effectiveness of the mitigation measures presented cannot be completely determined without extensive modelling.

4.4.4.5 Non-Aviation Alternative. Under the Non-Aviation Alternative, there would be no airport activity and less surface traffic than the Proposed Action or International Airport Alternatives; therefore, there would be less noise impacts than under the aviation-related alternatives. Surface traffic sound levels are represented in terms of DNL as a function of distance from the centerline of the roadways analyzed (Table 4.4-24). There would be an estimated 394 residents in areas exposed to noise levels of DNL 65 or greater due to surface traffic by the year 2013.

Cumulative Impacts. There are no cumulative impacts expected from noise sources for the Non-Aviation Alternative.

Mitigation Measures. A barrier along Air Base Road and portions of U.S. 395 may be a feasible way to reduce noise levels at nearby residences to below DNL 65 dB. Barriers for other roadways are not considered to be feasible due to the number of driveways and intersections near the impacted roadways. Mitigation measures such as a sound attenuation program similar to that identified for aircraft noise mitigation could be implemented to reduce interior noise levels for sensitive receptors exposed to DNL 65 dB or greater. Preventative measures such as restricting residential and hospital development to areas outside DNL

Table 4.4-23. Distance to DNL from Roadway Centerline - General Aviation Center Alternative

		Distance (feet)					
Year	Roadway	DNL 65	No. of Residences	DNL 70	No. of Residences	DNL 75	No. of Residences
1998	Air Base Road West	160	6	50	0	*	–
	Air Base Road East	320	6	100	2	*	–
	U.S. 395	360	23	110	0	30	0
	Crippen Avenue	80	12	*	–	*	–
	Village Drive**	180	2	60	0	*	–
	Shay Road	40	0	*	–	*	–
2003	Air Base Road West	210	6	70	0	*	–
	Air Base Road East	370	6	120	2	*	–
	U.S. 395	410	33	130	0	40	0
	Crippen Avenue	100	39	30	0	*	–
	Village Drive**	210	2	70	0	*	–
	Shay Road	60	0	*	–	*	–
2013	Air Base Road West	220	6	70	0	*	–
	Air Base Road East	380	7	130	2	50	0
	U.S. 395	460	43	150	13	40	0
	Crippen Avenue	110	39	30	0	*	–
	Village Drive**	210	2	80	0	*	–
	Shay Road	60	0	*	–	*	–

*Contained within roadway.

**Number of houses between Air Base Road and power lines south of Clovis Street (approximately 1.5 miles).

65 dB and incorporating barriers into community development can be used for future development.

The effectiveness of the mitigation measures presented cannot be completely determined without extensive modelling.

4.4.4.6 Other Land Use Concepts

U.S. Department of Justice. The proposed FCC is not planned to be located within the 65 dB contour for the Proposed Action or alternatives. As such, no noise impacts on the prison have been identified. Based upon the available details of this transfer, no noise impacts have been identified from the prison on the surrounding areas.

U.S. Department of Interior. The recreational facilities proposed to be transferred do not lie within the 65 dB contours for any of the alternatives. No noise impacts on these facilities have been identified. Additionally, based upon

Table 4.4-24. Distance to DNL from Roadway Centerline - Non-Aviation Alternative

Year	Roadway	Distance (feet)					
		DNL 65	No. of Residences	DNL 70	No. of Residences	DNL 75	No. of Residences
1998	Air Base Road West	100	2	30	0	*	–
	Air Base Road East	210	3	70	0	*	–
	U.S. 395	300	5	100	0	30	0
	El Mirage Road	100	0	40	0	*	–
	Helendale Road	30	0	*	–	*	–
	Village Drive**	110	2	*	–	*	–
	Shay Road	30	0	*	–	*	–
	Crippen Avenue	70	0	30	0	*	–
2003	Air Base Road West	160	6	50	0	*	–
	Air Base Road East	350	6	120	0	50	0
	U.S. 395	380	23	120	0	40	0
	El Mirage Road	130	0	50	0	*	0
	Helendale Road	50	0	*	–	*	–
	Village Drive**	190	2	60	0	*	–
	Shay Road	50	0	*	–	*	–
	Crippen Avenue	120	39	40	0	*	-
2013	Air Base Road West	270	9	80	2	30	0
	Air Base Road East	550	17	180	3	60	0
	U.S. 395	520	43	160	13	50	0
	El Mirage Road	290	0	100	0	40	0
	Helendale Road	90	0	30	0	*	–
	Village Drive**	320	8	100	0	*	–
	Shay Road	90	0	30	0	*	–
	Crippen Avenue	200	39	70	0	30	0

*Contained within roadway.

**Number of houses between Air Base Road and power lines south of Clovis Street (approximately 1.5 miles).

the available details of this transfer, no noise impacts have been identified from the recreational facilities on the surrounding areas.

U.S. Department of Housing and Urban Development. The residences requested for transference lie outside the 65 dB contours for airport noise. Some of the residences nearest Air Base Road could be exposed to noise levels above DNL 65, but as described in the alternatives, a noise barrier could be used as mitigation. No noise impacts have been identified from the housing on the surrounding areas.

U. S. Department of Transportation. The facility requested for transference lies outside the 65 dB contours. No noise impacts have been identified for this facility. Based upon the available details of this transfer, no noise impacts have been identified from this facility on the surrounding areas.

U.S. Department of Education. The facilities proposed to be transferred for the Department of Education do not lie within the 65 dB contours for any of the

alternatives. No noise impacts on these facilities have been identified. Additionally, based upon the available details of this transfer, no noise impacts have been identified from the educational facilities on the surrounding areas.

San Bernardino County Work Furlough Program. The dormitory or barracks of the proposed work furlough program are not proposed to be located within the 65 dB contour for the Proposed Action or alternatives. No noise impacts on these facilities have been identified. Additionally, based upon the available details of this conveyance, no noise impacts have been identified from these facilities on the surrounding areas.

Medical Facilities. The base hospital does not lie within the 65 dB contours for any of the alternatives. No noise impacts on this facility have been identified. Additionally, no noise impacts have been identified from the hospital on the surrounding areas.

4.4.4.7 No-Action Alternative. There would be no airport activity and minimal surface traffic under the No-Action Alternative. The anticipated surface traffic noise is estimated to be less than that of any of the other alternatives.

Cumulative Impacts. There are no cumulative impacts expected from transportation noise sources under the No-Action Alternative.

Mitigation Measures. Noise mitigation measures would not be required under the No-Action Alternative because there are no adverse effects associated with this alternative.

4.4.5 Biological Resources

The Proposed Action and alternatives (except No-Action) would result in alteration or loss of vegetation and wildlife habitat, including habitat for the desert tortoise, a federally and state-listed threatened species. These impacts are described below for each alternative.

Assumptions used in analyzing the effects of the Proposed Action and alternatives include:

- All staging and other areas disturbed temporarily by construction would be placed in previously disturbed areas (e.g., paved or cleared areas), to the fullest extent possible.
- Proportions of disturbance associated with each land use category were determined based on accepted land use planning concepts. Development within each parcel could occur at one or more locations anywhere within that category, unless designated as vacant land on the project maps.

4.4.5.1 Proposed Action. Development of a commercial airport at George AFB would affect biological resources primarily through vegetation/habitat loss, aircraft noise, and air pollutant emissions. The project area includes 5,073 acres

on the base, and an additional 2,352 acres off base (2,217 acres to the north and 135 acres to the south). Construction activities would disturb approximately 2,439 acres on base and 202 acres off base. The primary impacts of disturbance would be loss of native vegetation and its associated value as wildlife habitat and loss of habitat for the desert tortoise.

Vegetation. Overall, the Proposed Action would result in a maximum loss of approximately 1,290 acres of creosote bush scrub with scattered Joshua trees (native desert habitat) on base and another 202 acres off base, and 2 acres of riparian and wetland vegetation on base. The remainder of the construction disturbance (1,147 acres on base) would be in ruderal vegetation or presently disturbed areas that have low biological value. Disturbances would be spread over time in three development phases as shown in Table 4.4-25. These losses would result from new construction and renovation of existing airfield, aviation support, industrial, and commercial facilities. The least impact on native vegetation would occur in Phase 1 when most of the development involves use of previously disturbed areas. Losses of native vegetation increase in the next phases as more relatively undisturbed areas are used. During operations, vegetation maintenance around the airfield for safety could convert creosote bush scrub to ruderal vegetation through mowing or use of oil palliatives for dust control. In addition, Joshua trees in this area may be removed as part of those maintenance activities.

Table 4.4-25. Direct Impacts of the Proposed Action on Vegetation by Phase (acres)

Habitat	Phase 1	Phase 2	Phase 3
Native Vegetation[a]	120	500	857
Previously Disturbed[b]	483	287	394
Total	603	787	1,251

(a) Includes creosote bush scrub, Joshua trees, and riparian and wetland vegetation.
(b) Includes ruderal vegetation and disturbed areas (paved, barren, or buildings).

About 1 to 2 acres of riparian and wetland vegetation in the two drainages on the east side of existing housing and the one east of the crosswind runway could be directly affected if these drainages were modified (e.g., channelized) to accommodate increased peak stormwater runoff resulting from a greater area of impervious surfaces. Diversion of runoff to other (new) drainage structures could reduce the annual water flow in these drainages with detrimental indirect effects on the existing vegetation. These effects could occur during any of the phases and some would likely occur in each phase.

Most of the 374 acres in the eastern part of the base identified as recreation/vacant land (including the 77-acre golf course) are assumed to remain in their present state, but up to 15 acres of creosote bush scrub could

be lost in Phase 1. However, use of off-road vehicles, such as mountain bikes and motorcycles, in the 220 acres of creosote bush scrub and small riparian scrub areas (about 1 acre) would likely continue and could increase with greater ease of access, thus accelerating erosion and loss of native vegetation in the area. Indirect effects would also occur as a result of sediment and chemicals (e.g., cement, and fuels or lubricants leaked or spilled) carried in runoff from construction sites and paved surfaces during operations.

Replacement of vegetation with facilities, maintenance of vegetation near the runways for safety, altered runoff and drainage patterns, and runoff of pollutants would have long-term effects that would continue during operation. The resulting loss of native vegetation, particularly Joshua trees, pencil cholla, and riparian and wetland vegetation, would constitute adverse impacts.

Wildlife

Habitat Alteration and Loss. Wildlife would be affected by a long-term loss or alteration of habitat (see Vegetation discussed above) within the base boundaries and the 473 acres to be developed off-site (of which 202 would be disturbed by construction), except where drainages are indirectly altered off site. Loss or alteration of habitat would affect common wildlife species by displacement of mobile species to adjacent areas and mortality of less mobile species. If the adjacent habitat is already at its carrying capacity, the displaced animals would compete with the residents for available resources, causing ecological disruption until the populations decrease and equilibrium is re-established. Species that would be affected, if present, include those with relatively small home ranges such as some birds (e.g., roadrunner, cactus wren, American kestrel, and burrowing owl), mammals (e.g., jackrabbit and kangaroo rat), and reptiles. The loss of habitat could also affect wider-ranging species that forage in the area such as raptors (e.g., golden eagle, ferruginous hawk, and red-tailed hawk) and predatory mammals (e.g., coyote and kit fox). The ultimate effect would be a decrease in local populations of these species.

Loss of on-base landscaped areas would reduce the habitat available for species adapted to urban settings. Effects on their populations would be negligible because the area lost would be small compared to that available in the area and most, if not all, would be replaced by new landscaping.

Converting a maximum of 1,492 acres of creosote bush scrub to aviation support, industrial, and commercial development and fragmenting approximately 1,240 acres as vacant lands scattered among the developments would increase the abundance of species tolerant of these changes such as common ravens, house sparrows, European starlings, rock doves (domestic pigeons), and rodents. An increase in their population size in the area could adversely affect native species through predation (e.g., ravens on desert tortoise) or competition.

Noise/Activity. Activities and noise associated with demolition and construction of facilities would have short-term effects on local wildlife by causing those intolerant of such disturbances to avoid the vicinity of the project. Noise, activities, and lighting associated with operation of the airport and industrial/commercial facilities would continue these effects indefinitely. Operation of the airport would continue the aircraft noise and visual-presence effects presently occurring as a result of flight operations at George AFB. The type and frequency of noise events, however, would change because different aircraft would be involved. Most flight activity would be associated with the north-south runway and occur between 7 a.m. and 10 p.m. About 70 percent of these flights would be small, non-jet aircraft (see Table 4.2-3) that produce much less noise than commercial or military jet aircraft. The maximum (single event) estimated sound level over the Mojave River is 73 dB. This would occur infrequently because jet use of the airport would be a small proportion of the total flights and most activity would be on the north-south runway. Consequently, overall effects on wildlife populations adjacent to the base would be short term because most would be expected to habituate to the disturbance and return to their former habitats.

Effects on Aquatic Biota. No perennial aquatic habitats would be directly affected by the Proposed Action. Loss or alteration of the ephemeral drainages in the area would have minimal effects on aquatic biota.

Threatened and Endangered Species. Several federally and state-listed endangered, threatened, or candidate species in the vicinity of George AFB could be affected by the Proposed Action. The desert tortoise, a threatened (federal and state) species is known to be present and would be affected by the Proposed Action as described below. Other listed or candidate species that may be present but have not been documented to be on the base (see Appendix K) could also be affected by the project.

Desert Tortoise. Surveys on George AFB and in its immediate vicinity have located populations of the desert tortoise, a federally listed threatened species. Tortoises occur in low density (20 to 50 tortoises per square mile) in the north and southwest areas of the base, with one high-density area (50 to 100 per square mile) in the northeast corner.

Development of a commercial airport on George AFB could result in disturbance or loss of 753 acres of known habitat for the federally listed (threatened) desert tortoise, including 188 acres of high-density habitat by 2013. This would leave 116 acres of high density habitat and 165 acres of low density habitat intact outside the base boundary. The low density habitat would be lost in Phase 2 and the high density habitat in Phase 3. New taxiways to the aviation support areas and the perimeter road, to be relocated, may pass through one or both tortoise habitats during Phase I. Construction and use of these facilities could result in a permanent loss of habitat and tortoise mortality through road

kills, for example. The amount of habitat affected would depend on location of the road and taxiways. No construction of other facilities is expected to occur in this area. Soil disturbance could increase erosion and decrease plant (food) productivity. In addition, construction workers may collect tortoises for pets. Even handling them could result in stress or damage that would reduce their survival.

In addition to the disturbance or loss of known habitat, a maximum of 857 acres of unsurveyed potential tortoise habitat could also be disturbed or lost. New taxiways would be built in the airfield area during Phase 3, resulting in loss of up to 100 acres and fragmentation of 177 acres. Another 580 acres are in the proposed business park area, and this habitat would be permanently lost: 135 acres in Phase 1, about 225 acres in Phase 2, and 220 acres in Phase 3.

Indirect effects of the Proposed Action could also affect the desert tortoise. Any project-related increase in the local raven populations could adversely affect the desert tortoise through increased predation. Increasing human presence in the area would increase the potential for illegal collection of tortoises for pets. These effects would add to those of habitat loss.

The loss or disturbance of habitat and individual tortoises would constitute an adverse impact on this species. All tortoises within the area that would be disturbed during construction would need to be counted to quantify the impact, and this impact would likely require mitigation as described below. The Air Force has conducted informal Section 7 consultation with USFWS for potential land conveyance to private parties.

If portions of the property containing desert tortoises are transferred to another federal agency, that agency may be required to conduct additional consultation under Section 7 of the Endangered Species Act prior to irreversible or irretrievable commitment of resources to any project that could adversely affect the desert tortoise. Formal consultation under Section 7 of the Endangered Species Act is required if the federal agency determines that its action may affect listed species or critical habitat or if formal consultation is requested by the Director of the USFWS. Formal consultation is a process between the USFWS and the federal agency that concludes with the USFWS's issuance of a biological opinion that states whether or not the federal action is likely to jeopardize the continued existence of listed species or result in the destruction or adverse modification of critical habitat. A no-jeopardy opinion may include restrictions on the amount of incidental adverse effects to listed species and critical habitat. A USFWS opinion that the project could jeopardize the continued existence of a listed species or result in the destruction or adverse modification of critical habitat, known as a jeopardy opinion, would also include reasonable and prudent alternatives, if any, that the federal agency could implement to avoid jeopardizing the listed species or critical habitat. If a jeopardy opinion is issued, the federal agency will either alter or cease its action

to comply with the no-jeopardy mandate in Section 7(a)(2) of the Endangered Species Act or seek an exemption from this mandate under Section 7(h) of the Act.

For properties conveyed to non-federal and private parties, those parties would be subject to the prohibitions listed in Section 9 of the Endangered Species Act (16 USC §1538) and 50 CFR Part 17, Subparts C,D,F, and G. For certain activities involving the export, possession, taking, sale, or transport of threatened or endangered animal species, including the desert tortoise, non-federal and private parties would be required to obtain a permit under Section 10 of the Endangered Species Act (16 USC §1539) and 50 CFR Part 17, Subparts C and D.

Other Species. Habitat loss could affect the Mohave ground squirrel (a Category 2 candidate for federal listing and state-listed as threatened), San Diego coast horned lizard (federal candidate for listing and state designated as a species of special concern), and other candidate or sensitive species (Appendix K) if any of these species are present in or use the areas proposed for development.

Sensitive Habitats. The three small, on-base wetlands would likely be disturbed or possibly lost as a result of project construction and operation. Drainage patterns would likely be altered during development of the airport and runoff would be increased as a result of greater areas of impervious surfaces. The existing drainages may be lined with concrete for flood and erosion control, which would eliminate the present wetlands and associated riparian habitat; a maximum of 1.32 acres of wetlands could be affected. In addition, the wetlands could be adversely affected by sedimentation associated with construction, scour from increased runoff, and possibly accidental spills of toxic materials (during construction and operations). Although the area lost or degraded would be small and relatively insignificant biologically, this would be an adverse effect because federal and state policies dictate no net loss of wetlands. As noted above for vegetation, impacts would likely be spread over all three phases.

Filling of wetland areas totalling less than 10 acres does not require an individual COE permit, since this is an activity covered by the existing authorization of a nationwide permit. Filling of a wetland between 1 and 10 acres requires prior notification to the COE, whereas filling of a wetland under 1 acre does not. However, notification of the COE is recommended even in those cases where filling of less than 1 acre is anticipated.

Cumulative Impacts. Vegetation and wildlife habitat loss or alteration resulting from developing a commercial airport at George AFB would add to the small losses associated with planned highway upgrading and construction of other projects such as the SST. The increase in vehicular traffic associated with the proposed airport could be offset somewhat by predicted decreases in traffic, if and when the SST is completed.

Mitigation Measures. Because the desert tortoise is a federally listed species, USFWS may require mitigation or conservation measures to protect the species. Such measures could range from complete avoidance of known habitat areas to preparation and implementation of a habitat conservation plan by the new property owner for habitat that would be lost to any proposed development. For the latter, the project developer would have to consult with USFWS, California Department of Fish and Game, and possibly BLM to develop a habitat conservation plan prior to construction. The contents of this plan would depend on the official policy of the USFWS at that time regarding this species. Mitigation measures could range from redesign of the Proposed Action to avoid disturbance of tortoise habitat, to a capture and relocation program. The latter would include (1)surveys conducted in all areas that would be developed to locate tortoises, (2) collection and relocation of all individuals located to nearby suitable habitat using methods approved by these agencies, and (3) a monitoring plan for the relocation site(s) to be conducted for 3 years to determine survival rate and to identify further mitigation if necessary. Another potential mitigation measure would be to set aside and improve compensation habitat.

Surveys would also need to be conducted by the project developer in the appropriate season to determine if any federal candidate plant or animal species are present in the proposed development area. If any are found, a mitigation plan would need to be developed and implemented.

Complete avoidance of disturbance to known desert tortoise habitat would be highly effective in preventing impacts to the species. To be 100 percent effective, however, indirect impacts (e.g., ORV use, including bicycles, and collecting) would also need to be controlled. Development of a habitat conservation plan would also protect desert tortoises, but the effectiveness cannot be quantified until such a plan is developed and specific measure in the plan are evaluated.

Wetlands on base would be protected in compliance with Executive Order 11990 and Section 404 of the Clean Water Act. Mitigations could include (1) avoidance of direct and indirect disturbance of wetlands through facility design; (2) on-site (if possible) replacement of any wetlands lost at a ratio determined through consultation with USFWS and COE; (3) recreation of wetland habitat elsewhere on site or purchase and fencing of any off-site replacement habitat; and (4) monitoring (until habitat becomes well established) of any replacement wetlands required to determine the effectiveness of replacement and any remedial measures necessary. Avoidance of disturbance could include controlling runoff from construction sites into drainages through use of berms, silt curtains, straw bales and other appropriate techniques. Equipment could be washed in areas where wash water could be contained and treated or evaporated.

Protection under Executive Order 11990 would depend on the type of stipulations placed on the land conveyance. Effectiveness could range from 0 to 100 percent. Section 404 of the Clean Water Act generally applies only to wetlands larger than 1 acre, and thus, would not be effective in protecting the small wetlands on George AFB.

Avoidance of direct and indirect impacts to wetlands would be 100 percent effective in protecting these habitats. Controlling runoff of pollutants to wetlands can be accomplished with existing techniques, but monitoring is necessary to ensure that the measures are employed correctly and that structures are maintained adequately. Re-creation of wetland habitats (either on or off site), however, can have varying success in mitigating that loss. Unless the new habitat is fully developed prior to the loss, no mitigation is obtained for the temporal loss of this habitat. Re-creation of wetlands has had varying degrees of success in the past.

4.4.5.2 International Airport Alternative. Conversion of George AFB and the surrounding area to an international airport would affect biological resources primarily through vegetation/habitat loss including 5,755 acres of habitat having value to wildlife as compared to a total of 1,492 acres for the Proposed Action. Effects of operation are not expected to have substantial impacts on wildlife populations as described below.

Vegetation. Development of the HDIA, its support facilities, and related commercial developments would result in the use of 13,426 acres of land: 8,353 acres off base and 5,073 acres on base. Construction activities could cause a maximum loss of 1,424 acres of creosote bush scrub and 1 acre of wetlands on base, and 3,680 acres of creosote bush scrub plus 650 acres of Joshua tree woodland off base, through vegetation clearing and grading for facility sites and staging areas (e.g., materials and equipment storage). The remainder of the on- and off-base areas that would be disturbed during construction (1,332 acres) is landscaped or does not support vegetation due to the presence of pavement and buildings. As for the Proposed Action, these disturbances would be spread over time in three development phases (Table 4.4-26). Most of the development in each phase would be in areas of native vegetation. Phase 2 is predominantly airfield development.

Vegetation maintenance around the runways for safety during operation of the airport would adversely affect at least part of the remaining airfield expansion area. In addition, areas of native vegetation temporarily disturbed during construction may not recover to pre-project conditions and would thus remain weedy or semi-barren. The loss of native vegetation would have an adverse impact, particularly for Joshua trees and pencil cholla. The latter two species occur scattered throughout the creosote bush scrub and are given special consideration under the California Desert Native Plant Act.

Table 4.4-26. Direct Impacts of the International Airport Alternative on Vegetation by Phase (acres)

Habitat	Phase 1	Phase 2	Phase 3
Native Vegetation[a]	1,185	3,694	875
Previously Disturbed[b]	247	960	125
Total	1,432	4,654	1,001

(a) Includes creosote bush scrub, Joshua trees, and riparian and wetland vegetation.
(b) Includes ruderal vegetation and disturbed areas (paved, barren, or buildings).

Construction of the airport would result in changes in the topography and/or drainage patterns of lands on the base and within the ADD, particularly through development of drainages to carry storm runoff from impermeable surfaces. This would likely cause adverse effects on the ephemeral washes and their associated sparse riparian/wetland plant assemblages by removing vegetation or altering the natural flow regime. The increased peak runoff may require channelization and maintenance of existing or new drainages to control erosion and flooding. This could result in a loss of native vegetation and prevent its reestablishment. Increasing temporal flow in existing drainages could cause a periodic removal of vegetation through scour while increased moisture could stimulate plant growth. A decrease in temporal flow in natural channels through diversion to other drainage structures could reduce the water supply to vegetation along the natural channels, thereby affecting its growth and productivity. Runoff of sediments from disturbed soils, construction materials such as cement, and fuels or lubricants leaked onto paved surfaces could also affect vegetation in these drainages. Existing drainages that contain wetland/riparian vegetation supported by runoff from developments (e.g., housing and runways) could be adversely affected through alteration of runoff patterns and channelization. Impacts could be minimized by controlling development and regulating runoff near these areas. Wetlands are discussed under Sensitive Habitats within this section.

Wildlife

Habitat Alteration and Loss. The primary effects of the International Airport Alternative on wildlife would be a long-term habitat alteration or loss that could cause a decrease in the local population size of species associated with desert scrub communities (see Vegetation above for areas affected) as described for the Proposed Action. The area affected, however, would be much larger. In addition, fragmentation of desert scrub habitat (i.e., 3,777 acres in parcels of vacant land interspersed with development) would reduce its value to wildlife and the carrying capacity for most native species. Effects would be additive to those of direct habitat loss.

As for the Proposed Action, removal of on-base landscape trees, shrubs, and grasses would result in habitat loss for species adapted to urban settings with potential effects on their populations. Likewise, the change in habitat from native vegetation to industrial development would result in an increase in species tolerant of these changes resulting in additional adverse effects on native species.

Noise/Activity. Construction activities and the associated noise would have short-term effects on local wildlife, as described for the Proposed Action but over a larger area. Noise, activities, and lighting associated with the operation of an airport would continue these effects indefinitely.

During airport operations, aircraft noise and visual presence could startle and negatively affect wildlife living near the airport, particularly in the Mojave River riparian zone. However, most species that inhabit the area are probably already noise-tolerant as a result of the present jet noise from George AFB.

Jet use of the airport would increase from about 57 percent of the estimated annual operations in 1998 to 79 percent in 2013 (see Table 4.2-5). Most of the noise would be concentrated to the north of the north-south runways and southwest of the crosswind runway (see Figures 4.4-14 through 16). The maximum (single event) estimated sound level over the Mojave River is 73 dB. Most flight activity would occur between the hours of 7 a.m. and 10 p.m. with few flights (primarily landings) crossing the Mojave River. Noise events from the proposed international airport thus would generally be lower in magnitude but more frequent than from the present military jet operations at George AFB. The greater frequency (number) of noise events over time may cause some wildlife (individuals) to avoid the ends of the runways, but populations of these animals in the region would not be adversely affected. Most animals would adapt to the noise. Wildlife use of the Mojave River riparian forest would not be adversely affected as described for the Proposed Action.

Effects on Aquatic Biota. No perennial aquatic habitats are present in the area that would be developed under the proposed international airport, other than the maintained pond for golf course irrigation. Loss or alteration of the ephemeral drainages on the site would have minimal effects on aquatic biota. Increased runoff from impervious surfaces of the proposed development could provide more water for aquatic biota.

Threatened and Endangered Species. Several federally and state-listed threatened, endangered, and candidate species are known to occur within the vicinity of George AFB and could be affected by development of the proposed international airport, particularly the desert tortoise.

Desert Tortoise. The entire planning area for the ADD has not been surveyed specifically for the desert tortoise, but suitable habitat is present and may contain additional tortoises. Development of the international airport would

result in the physical disturbance of 4,583 acres. Because of fragmentation, however, the disturbance or loss of suitable tortoise habitat could be 9,040 acres, including the entire 304 acres of high-density habitat and 585 acres of low-density habitat. The remaining 8,150 acres affected by the project are unsurveyed suitable habitat that could support low tortoise densities.

Approximately 415 acres of the low-density habitat and all 304 acres of the high-density habitat would be within the airfield category to be developed in Phase 2. Extension of the existing crosswind runway and construction of a new runway parallel to it would fragment and reduce these habitats by as much as 50 percent or more. Other facilities would not be constructed in these areas, but habitat disturbance could occur as a result of maintenance activities such as mowing and use of oil palliatives. As described for the Proposed Action, possible collection by workers would adversely affect the tortoise populations. The remaining approximately 170 acres of low-density habitat would be permanently lost due to construction of industrial aviation facilities.

About 5,565 acres of suitable tortoise habitat are in the airfield area north of the base where new runways would be built in Phase 2. Approximately 50 percent (2,783 acres) of this habitat would be permanently lost and additional areas would be disturbed by construction activities. Another 2,585 acres of suitable habitat are present in areas where aviation support, industrial, and industrial aviation facilities would be built. Approximately 1,800 acres of this would be permanently lost: 625 acres in Phase 1, 1,300 acres in Phase 2, and 875 acres in Phase 3. Fragmentation of the habitat within these development areas could increase the loss of viable habitat (i.e., large enough to support a population of desert tortoises) substantially.

Indirect effects on the desert tortoise would be similar to those described for the Proposed Action, but the larger area proposed for development would increase the potential for such impacts. Such effects would be additive to the direct impacts of habitat disturbance and loss.

In summary, a minimum of 377 acres of low-density habitat, 152 acres of high density habitat, and 4,583 acres of suitable habitat but unsurveyed would be lost during construction of the airport as detailed in the preceding paragraphs. This habitat loss would be an adverse impact requiring formal consultation with the USFWS, as described for the Proposed Action. Mitigation for these losses would be required (see Mitigations).

Other Species. The Mohave ground squirrel, a species listed by California as threatened and a Category 2 candidate for federal listing, also occurs within the project area. The relatively undisturbed acreage within the ADD is suitable habitat for the squirrel, and any loss of habitat would constitute an adverse impact.

The San Diego coast horned lizard has been observed just outside the project area and is probably common throughout the area, as suitable habitat is present. Development of the airport could possibly adversely affect this federal candidate species through habitat loss and increased predation by ravens attracted to the project or by other species displaced by the project.

Two annual plant species that are candidates for federal listing, the desert cymopterus and the Mojave monkeyflower, are likely to occur in the ADD according to known habitat, distribution, and nearby reported occurrences; however, surveys for these plants have not been undertaken at the optimum time of year. These species could possibly be adversely affected by development of an airport.

Several additional sensitive species that occur within the ADD (primarily California Species of Special Concern, see Appendix K) could also be negatively affected by the international airport through habitat loss.

Sensitive Habitats. Construction of the international airport would likely affect the small wetlands on the base. The base residential area would not be preserved and incorporated into the airport plans, and the two small wetlands on the east side of the housing area would likely be adversely affected during demolition of the residential area and replacement with commercial facilities in Phase 1. In addition, the increase in impervious surfaces would generate more runoff than from the housing area, and this would probably be channeled into these natural drainages. Effects on the wetlands could be positive, negative, or negligible, depending on the quantity and quality of this runoff. The 0.87-acre wetland in a drainage in the northeastern part of the base would likely be removed by new construction in Phase 2. However, the creation of larger runways and other impervious surfaces in the same vicinity would probably lead to increased runoff that would create similar conditions elsewhere in the drainage, assuming the drainages would not be lined with concrete. If the wetlands were not directly removed during construction of the airport and associated facilities, they could be adversely affected by sedimentation associated with construction or scour from increased runoff. Impacts and permit requirements would be as described for the Proposed Action.

The wetland and riparian areas associated with the Mojave River would not be directly impacted by construction or normal operation of the international airport because the river is not included in the ADD. Runoff from the airport during construction and operations would be unlikely to add sediments (sand, soils and construction material) and pollutants to the Mojave River, but if they occur would likely be local and short term.

Cumulative Impacts. Vegetation and wildlife habitat loss or alteration resulting from the development of an international airport at George AFB would add to the small losses associated with planned highway upgrading and construction of other projects such as the SST. The increase in vehicular traffic associated

with the airport could be offset somewhat by predicted decreases in traffic if and when the SST is completed.

Mitigation Measures. Mitigation measures to offset adverse effects would be similar to those described for the Proposed Action.

4.4.5.3 Commercial Airport with Residential Alternative. Effects of construction and operation of this alternative on biological resources would be similar to those discussed for the Proposed Action (Section 4.4.5.1). The total amount of natural vegetation and habitat lost or altered would be nearly the same. The 473 acres off base would not be used in this alternative, but most of the 297 acres of vacant land (primarily creosote bush scrub) in the Proposed Action would be used for residential development. This would increase the loss of native vegetation and wildlife habitat by about 46 acres. Native vegetation losses would occur in each of the three development phases as shown in Table 4.4-27. The quantity lost in the first two phases is due to new residential development while the loss in Phase 3 would result from residential and industrial development.

Table 4.4-27. Direct Impacts of the Commercial Airport with Residential Alternative on Vegetation by Phase (acres)

Habitat	Phase 1	Phase 2	Phase 3
Native Vegetation[(a)]	143	428	969
Previously Disturbed[(b)]	287	457	284
Total	430	885	1,253

(a) Includes creosote bush scrub, Joshua trees, and riparian and wetland vegetation.
(b) Includes ruderal vegetation and disturbed areas (paved, barren, or buildings).

Loss or alteration of 1,540 acres of native vegetation and fragmentation of the remaining 717 acres of this vegetation type on the base would reduce its value to wildlife and thus the local abundance of native animals. Non-native species would be favored by the habitat change and could adversely affect native wildlife through predation or competition as described for the Proposed Action.

The potential for disturbance of high-density desert tortoise habitat (188 acres) would be the same as for the Proposed Action prior to full development (i.e., disturbance of 63 acres in Phase 1 and loss of 125 acres in Phase 3). About 185 acres of low-density habitat in the southwest portion of the base would be permanently lost to industrial development in Phase 3. The remaining 100 acres of this habitat would be in the safety clear zone south of the runways and surrounded by development. Fragmentation of the habitat in this manner would likely result in an area too small to support a viable tortoise population because individual home ranges are generally on the order of 100 to 640 acres (Burge, 1977; Berry, 1974). Thus, the entire 285 acres of low-density habitat would be lost.

The 430-acre, low-density tortoise habitat in and adjacent to the northeast corner of the base would also be fragmented by this alternative. Part would be permanently lost as a result of industrial (Phase 3) and residential (Phase 1) development, and part would be in the safety clear zone at the end of the crosswind runway. Approximately 70 acres would be left as a linear corridor of vacant land nearly surrounded by development (mostly residential), and 150 acres along the eastern base boundary would remain undeveloped. Recreational activities of residents, such as mountain biking and dirt biking (motorcycles), would degrade the undisturbed habitat and possibly cause direct mortality of tortoises. Furthermore, handling or collection of desert tortoises for pets by local residents would likely occur. Thus, the tortoise population in this area would likely be eliminated due to residential development.

The amount of suitable habitat permanently lost would be about 480 acres. Indirect effects would be similar to those discussed for the Proposed Action and would add to the direct habitat loss impacts. Overall habitat loss, including indirect effects of collection or handling and increased predation, would have an adverse impact on the desert tortoise. Formal consultation with USFWS and mitigation would be required, as described for the Proposed Action. Other sensitive species would be affected the same as for the Proposed Action.

Cumulative Impacts. Cumulative impacts are the same as for the Proposed Action.

Mitigation Measures. Mitigation measures would be the same as for the Proposed Action, but would be required only within the base boundaries.

4.4.5.4 General Aviation Center Alternative. Construction and operation of this alternative would affect biological resources through vegetation/habitat loss, aircraft noise, and air pollutant emissions. The area to be used would be approximately 2,840 acres (of which 220 acres would be subject to disturbance) with the remaining 2,233 acres to be left in its present state. Loss of creosote bush scrub and impacts to the desert tortoise are the primary impacts of this project, and all would occur in Phase 1.

Vegetation. Vegetation within the 1,573-acre airfield designation would not be directly affected by construction activities. During operations, however, vegetation maintenance for safety could convert creosote bush scrub to ruderal vegetation through mowing or use of oil dust palliatives. Development of aviation support facilities would affect 15 acres of creosote bush scrub and 205 acres of ruderal vegetation and disturbed areas.

Minor disturbances to existing landscaping could occur during modifications to existing buildings, including housing units. The small wetland and riparian scrub areas on the base are not likely to be affected by these construction activities.

Use of the creosote bush scrub areas for movie sets in otherwise undeveloped area could disturb the native vegetation and soils, leading to a weedy or semi-barren condition. In addition, use of off road vehicles in the vacant land adjacent to the housing area would likely continue and could increase due to greater ease of access. This activity would increase erosion and loss of native vegetation in both creosote bush scrub and riparian scrub plant communities. Loss or long-term disturbance of native vegetation, particularly Joshua trees, pencil cholla, and riparian vegetation, would have adverse effects on the local vegetation.

Wildlife. Wildlife would be affected by the long-term alteration or loss of habitat (primarily vegetation as discussed above). Construction activities (Phase 1) would displace mobile species to adjacent areas and cause mortality of less mobile species as described for the Proposed Action. The amount of habitat and number of animals, however, would be smaller. Activities and noise associated with construction would cause those animals intolerant of such disturbances to temporarily avoid the area. Operation of the facilities proposed would continue many of the current noise, lighting, and visual effects on wildlife, but the type and frequency of noise events would change. Most of the flights would be small non-jet aircraft that produce much lower sound levels than do military jets. Flight activity would be primarily along the crosswind runway and during the day. Overall effects on wildlife populations on or adjacent to the base would be short term because most animals would habituate to the disturbance and return to their former habitats. The General Aviation Center Alternative would not directly affect aquatic habitats on or adjacent to the base.

Threatened and Endangered Species. Development of the General Aviation Center Alternative on George AFB would be unlikely to adversely affect most of the listed or sensitive species known from the vicinity of the base (Appendix K).

Desert Tortoise. The proposed development (all in Phase 1) would cause a permanent loss of approximately 9 acres of low-density desert tortoise habitat and divide the habitat into two segments as a result of new road construction to connect Shay Road with residential and commercial areas. The airfield would encompass 118 acres of high-density and 330 acres of low-density tortoise habitat, but no construction activities are expected to occur in these areas. Construction-related activities, including indirect effects however, could adversely affect the desert tortoise and their habitat as described for the Proposed Action.

The loss or disturbance of habitat and individual tortoises would constitute an adverse impact on this species. Formal consultation with the USFWS and mitigation under Section 7 or Section 10 of the Endangered Species Act, as amended, would be required.

Other Species. Habitat disturbance or loss could affect the Mohave ground squirrel, San Diego coast horned lizard, and other candidate or sensitive

species, if any of these species are present in or use the areas proposed for development.

Sensitive Habitats. The three small wetlands on the base are not likely to be directly affected by the General Aviation Center Alternative. The wetland in the drainage ditch along the northeast side of the crosswind runway could be affected by runoff of sediment from runway or commercial construction and possibly by accidental spills of toxic materials during construction.

Cumulative Impacts. Vegetation and wildlife habitat loss or alteration resulting from developing an aviation center at George AFB would add to the small losses associated with planned highway upgrading and construction of the SST project.

Mitigation Measures. Mitigation measures would be similar to those described for the Proposed Action. Mitigation, however, would be required only within base boundaries and on a lesser scale as a result of the lower impacts associated with the General Aviation Center Alternative.

4.4.5.5 Non-Aviation Alternative. Development of non-aviation facilities and residential areas on the base would require demolition of some existing aircraft-related facilities and construction of new industrial and institutional facilities and of residential units. Of the 3,762 acres to be disturbed during construction, a maximum of 1,819 acres would be creosote bush scrub. The remainder of the disturbance would be in ruderal vegetation, urban/landscaped areas, and disturbed areas. The distribution of the impacts in the three development phases is shown in Table 4.4-28. The loss of native vegetation is related primarily to residential development although industrial development in Phase 3 contributed 120 acres. Landscaping of residential areas would provide habitat for species (primarily non-native) tolerant of human activity and adapted to this type of environment. An increase in these species could adversely affect local populations of native species through competition or predation. The existing 1.32 acres of wetlands and associated riparian habitat on base would likely be lost or altered, as described for the Proposed Action.

Table 4.4-28. Direct Impacts of the Non-Aviation Alternative on Vegetation by Phase (acres)

Habitat	Phase 1	Phase 2	Phase 3
Native Vegetation[a]	45	579	1,195
Previously Disturbed[b]	930	585	428
Total	975	1,164	1,623

(a) Includes creosote bush scrub, Joshua trees, and riparian and wetland vegetation.
(b) Includes ruderal vegetation and disturbed areas (paved, barren, or buildings).

On-base desert tortoise populations would be directly and indirectly affected by the Non-Aviation Alternative. In Phase 3 approximately 160 acres of

high-density habitat would be permanently lost, and 28 acres would remain in a strip between two residential areas. About 475 acres of low-density habitat would be lost (300 acres in Phase 1, 50 acres in Phase 2, and 125 acres in Phase 3) with 90 acres remaining in a strip of vacant land between residential areas. As for the Commercial Airport with Residential Alternative, approximately 480 acres of suitable habitat would be permanently lost (Phase 2). The narrow band of habitat remaining between residential areas is unlikely to support a viable tortoise population in the long term as a result of small habitat size and indirect effects of human presence (e.g., collecting and off-road vehicle activity). Thus, this area would be added to the direct habitat loss. Placing residential areas adjacent to the remaining high- and low-density habitat along the northeast corner of the base would increase the potential for similar indirect effects in these habitats. Another indirect effect that could occur is an increase in the population of ravens or other tortoise predators. Overall impacts on the species would be adverse and require formal consultation with the USFWS, as described for the Proposed Action.

Cumulative Impacts. Cumulative impacts are the same as for the Proposed Action.

Mitigation Measures. Mitigation measures would be the same as for the Proposed Action but within the base boundaries only.

4.4.5.6 Other Land Use Concepts. As described in Section 2.3.5, several federal transfers and independent land use concepts have been identified. These actions may take place in addition to one of the integrated reuse alterations.

U.S. Department of Justice. Potential impacts to biological resources may result from construction of the FCC on undeveloped land. The parcel consists of creosote brush scrub with a lesser area of ruderal habitat. The western and southern portions of the proposed site are unsurveyed, but assumed to be low-density tortoise habitat. The remaining acres are not assumed to be viable tortoise habitat. Construction of facilities and operational activities could result in a maximum loss of 580 acres of potential tortoise habitat as discussed for the Proposed Action.

U.S. Department of Interior. This transfer would not result in any impacts to biological resources because no construction would be required.

U.S. Department of Housing and Urban Development. This transfer would not result in any impacts to biological resources because renovations would be minor and limited to painting, carpeting, and fixture replacement.

U.S. Department of Transportation. Because this transfer would not involve new construction, there would be no impact to biological resources.

U.S. Department of Education. Impacts to biological resources are expected to be minimal or nonexistent because the majority of the properties/parcels are existing facilities.

San Bernardino County Work Furlough Program. No impacts to biological resources would result from this action because new construction would be limited to minor renovation.

Medical Facilities. No impacts to biological resources would result from the conveyance of the base hospital because new construction, if any, would be limited to minor renovation.

4.4.5.7 No-Action Alternative. Maintenance of the base under the DMT would have minimal adverse effects on biological resources. A reduction in human activity and a cessation of aircraft flights would reduce disturbance (particularly by noise) to wildlife on and in the vicinity of the base. Habitat quality for wildlife could improve if mowing of nonlandscaped areas is terminated, thereby allowing vegetation to grow to its natural height. Cessation of landscape irrigation in the housing area would reduce the water supply to the two small wetlands (about 0.5 acre combined) adjacent to the housing. This could reduce the size of these wetlands or possibly eliminate them. No physical alteration of the habitat would occur, however, and wetland vegetation could reestablish if the water supply were restored.

Cumulative Impacts. No cumulative impacts would result from the No-Action Alternative.

Mitigation Measures. No mitigation measures would be required.

4.4.6 Cultural Resources

Potential impacts were assessed by (1) identifying types and possible locations of reuse activities that could directly or indirectly affect cultural resources, (2) identifying the nature and potential significance of cultural resources in potentially affected areas, and (3) classifying potential effects as significant, insignificant, or beneficial.

Air Force requirements under Section 106 of the NHPA are completed, since SHPO concurred that the disposal of George AFB would have no effect on historic properties. However, reuse activities could still affect cultural resources which may exist in off-base parcels to be acquired under certain plans.

4.4.6.1 Proposed Action. Because there are no significant historic properties or paleontological resources on base, reuse activities will not affect cultural resources. Furthermore, no concern was expressed by Native Americans when consulted regarding reuse activities on base. Therefore, reuse activities would not affect Native American resources.

Off-base parcels identified for acquisition may contain cultural resources. The off-base area along the Mojave River terrace is known to be highly sensitive in regard to the presence of subsurface archaeological deposits. Eastern boundaries of the airfield and aviation support land areas lie close to this terrace. However, no impact is foreseen in conjunction with the potential development of this property, because provisions of the NHPA and the California Environmental Quality Act (CEQA) provide for the consideration of cultural resources prior to any ground disturbance. Furthermore, off-base areas included within the overall airport district would be subject to provisions of NEPA under FAA mandates regarding requirements for ALP approval.

Cumulative Impacts. No cumulative impacts are anticipated in association with the implementation of the Proposed Action.

Mitigation Measures. A complete cultural resource investigation in and around off-base areas proposed for development would be required of the reuse proponent prior to any construction or ground-disturbing activity. Sites potentially affected by these actions will thus be identified and mitigation measures to eliminate or reduce adverse effects may then be developed accordingly.

If methods are developed in consultation with SHPO, this identification effort will ensure compliance with cultural resource requirements.

4.4.6.2 International Airport Alternative. This alternative is similar in nature to the Proposed Action, with the major difference being the amount of and location of off-base land identified for acquisition. The off-base parcel proposed for the crosswind runway extension lies very close to the significant archaeological deposits along the Mojave River. In addition to the sensitivity of the Mojave River terrace area, the northern portions of the off-base properties are likely to contain historic resources. This likelihood is based on historic map and archival research that indicates use of this area dating back to the 1880s.

Beyond this additional area of probability where cultural resources may be found, the discussion regarding impacts for the Proposed Action (Section 4.4.6.1) is equally appropriate for this alternative.

Cumulative Impacts. No cumulative impacts are anticipated in association with the implementation of the International Airport Alternative.

Mitigation Measures. Appropriate mitigation measures are the same as those outlined for the Proposed Action.

4.4.6.3 Commercial Airport with Residential Alternative. This alternative is similar to the Proposed Action, except that all reuse plans are to be contained within current base boundaries. Therefore, reuse activities will have no effect on cultural resources.

Cumulative Impacts. No cumulative impacts are anticipated in association with the implementation of the Commercial Airport with Residential Alternative.

Mitigation Measures. No mitigation measures are required for this alternative.

4.4.6.4 General Aviation Center Alternative. Since all activity is contained within on-base property, this alternative will have no effect on cultural resources.

Cumulative Impacts. No cumulative impacts are anticipated in association with the implementation of the General Aviation Center Alternative.

Mitigation Measures. No mitigation measures are required for this alternative.

4.4.6.5 Non-Aviation Alternative. Since all activity is contained within on-base property, there will be no effect on cultural resources.

Cumulative Impacts. No cumulative impacts are anticipated in association with the implementation of the Non-Aviation Alternative.

Mitigation Measures. No mitigation measures are required for this alternative.

4.4.6.6 Other Land Use Concepts. None of the proposed plans identified as federal transfers or independent land use concepts would have an impact on cultural resources.

4.4.6.7 No-Action Alternative. There would be no effect on cultural resources resulting from implementation of the No-Action Alternative.

Cumulative Impacts. No cumulative impacts are anticipated in association with the implementation of the No-Action Alternative.

Mitigation Measures. No mitigation measures would be required under this alternative.

4.5 IRREVERSIBLE AND IRRETRIEVABLE COMMITMENTS OF RESOURCES

Irreversible and irretrievable resource commitments are related to the use of nonrenewable resources and the effects that use of these resources will have on future generations. Irreversible effects primarily result from use or destruction of a specific resource (e.g., energy and minerals) that cannot be replaced within a reasonable time frame. Irretrievable resource commitments involve the loss in value of an affected resource that cannot be restored as a result of the action (e.g., extinction of a threatened or endangered species).

Disposal of George AFB will not result in any irreversible and irretrievable commitments of resources.

4.6 RELATIONSHIP BETWEEN SHORT-TERM USE AND LONG-TERM PRODUCTIVITY OF THE ENVIRONMENT

Short-term uses of the biophysical components of man's environment include direct construction-related disturbances and direct impacts associated with an increase in population and activity that occurs over a period of less than 5 years. Long-term uses of man's environment include those impacts occurring over a period of more than 5 years, including permanent resource loss.

Construction effects from the Proposed Action and alternatives would result in short-term adverse impacts on local air quality, soil erosion, vegetation, desert tortoise habitat, and traffic. After construction is completed, most of these impacts would subside, with the exception of vegetation and desert tortoise habitat loss. Effects on these resources would be greatest in off-base, high desert areas to be acquired. Mitigation measures, such as replanting vegetation and relocation of habitat set-aside for tortoises, would be implemented to reduce the overall impacts to these resources in the long term. The only other potential adverse long-term effect would be acceleration of aquifer drawdown in the Mojave basin. This aquifer is already in a state of overdraft that would be exacerbated by the development of the George AFB property. Local water authorities have been seeking alternative methods of using/providing water to remedy this situation.

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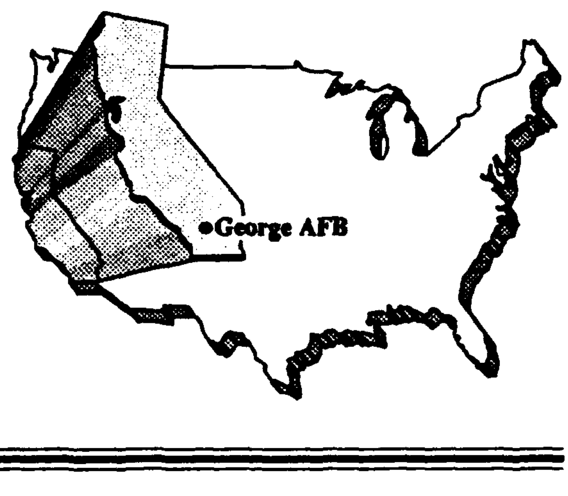


CHAPTER 5
CONSULTATION AND COORDINATION

5.0 CONSULTATION AND COORDINATION

The federal, state and local agencies and private agencies/ organizations that were contacted during the course of preparing this Environmental Impact Statement are listed below.

FEDERAL AGENCIES

Federal Aviation Administration
Environmental Protection Agency
National Solid Waste Management Association
Soil Conservation Service
United States Air Force, George AFB
United States Department of the Interior/National Park Service
United States Department of Transportation
United States Fish and Wildlife Service
Veterans Administration

STATE AGENCIES

California Department of Airports
California Department of Fish and Game
California Department of Forestry and Fire Protection
California Department of Parks and Recreation
California Department of Transportation (Caltrans)
California Environmental Protection Agency
California State University - Planning Department
State Office of Historic Preservation

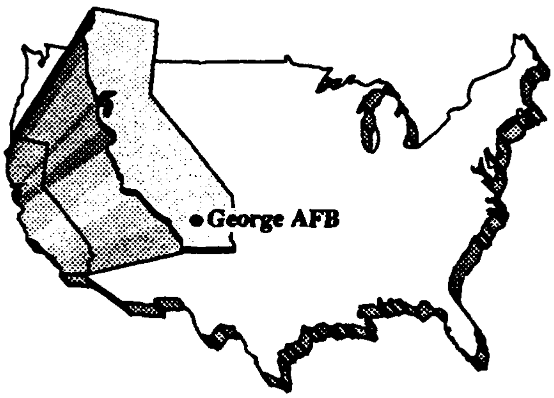
LOCAL/REGIONAL AGENCIES

Adelanto Water District
Apple Valley Ranchos Water District
City of Adelanto
City of Hesperia
City of Victorville
County of San Bernardino
County of Victor Valley
Department of Health and Safety, Public Water Supply
Hesperia Water District
Mojave Water Agency
Personal consultant to city of Adelanto, Dan Cortwright
San Bernardino Associated Governments
San Bernardino County Air Pollution Control District

San Bernardino County Solid Waste Planning and Recycling
Southern California Association of Governments
Town of Apple Valley
Victor Valley Economic Development Authority (VVEDA)
Victor Valley Wastewater Reclamation Authority (VVWRA)

PRIVATE ORGANIZATIONS AND INDIVIDUALS

Bechtel Corporation
ERA
P&D Technologies
Southern California Edison Company
Southwest Gas Corporation
The Planning Center - Adelanto



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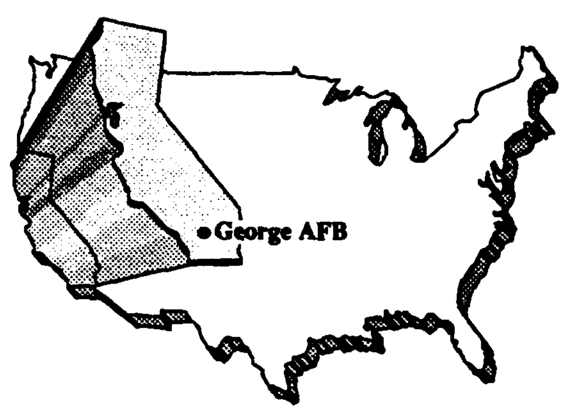

CHAPTER 7
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City of Victorville, see Victorville, City of.

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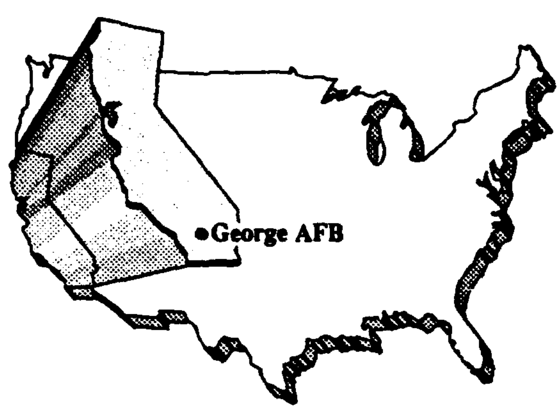

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